Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Architecture and Design
Department of Design

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The role of parents in children´s digital learning at home:

a domestication theory perspective

Master's thesis in Interaction Design
Supervisor: Emil Bakke
June 2022

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Kunnskap for en bedre verden

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Completed by Mina Nordby

Preface

This thesis marks the end of the master's degree programme in Interaction Design at the Norwegian University of Science and Technology in the spring of 2022.

First of all, I want to express gratitude toward my boyfriend, Magnus, and my loving family for their encouragement and patience. A big thank you also to my friends, and my clever classmates, Signe, Rebekka, Elen, and Muthita for sharing motivations, frustrations, and valuable knowledge.

I will also thank my supervisor at NTNU, Emil Bakke, who has provided good input and support along the way, challenged me, and had faith in the project.

Furthermore, I will say thank you to everyone who has contributed through interviews, digital questionnaire, and interesting conversations.
This thesis would not have been possible without you.

Mina Nordby
June 2022

Abstract

When the Ministry of Education published in 2017, the digitalization strategy for the primary and secondary education sector, it led to huge engagement from parents. who were already trying to reduce their children´s time on screens. The government's guidelines regarding digitalization in primary school had a major impact not only on teachers and pupils but also the parents. However, one group that can then often be forgotten is the parents, who also have a very important role in the child's learning. The purpose of this master's thesis has been to find out what the parents' role in the children's digital learning is, from a domestication theoretical perspective.

The study has examined several research questions regarding parents' attitudes, concerns, and involvement regarding children's use of the digital learning tool iPad. Research has also been conducted on parents' adaptation to a digital learning environment at home, their digital competence, and motivation to participate in their children's associated learning platform through school.

Through an exploratory research design, both qualitative and quantitative methods have been conducted. Through qualitative structured interviews, 4 primary school teachers participated. These interviews were further transcribed and analyzed through the affinity diagram design method. The quantitative digital questionnaire was answered by 51 parents with children in primary school, which was analyzed through the data matrix that was created after completing the questionnaire.

This study shows that parents have many different and important roles in their children's digital learning that this should be focused more on. The main finding of the study is that despite high digital competence, motivation, and commitment, parents are still concerned about their children's use of digital tools such as iPad. This master's thesis concludes by coming up with a design proposal for the solution to these concerns and encourages the authorities and municipalities in Norway to put more focus on parental involvement forward.

Sammendrag

Da regjeringens digitale handlingsplan for grunnskolen ble publisert i 2017, førte den med seg et stort engasjement blant foreldre, som allerede prøvde å minske barnas skjermtid. Regjeringens retningslinjer angående digitalisering i grunnskolen hadde ikke bare en stor påvirkning på lærere og elever, men også foreldre. Likevel, er foreldrene en gruppe som ofte blir glemt, selv om de har en svært viktig rolle i barnas læring. Formålet med denne masteroppgaven har dermed vært å finne ut hva foreldrenes rolle i barnas digitale læring er, fra et domestiseringsteoretisk perspektiv.

Studien har undersøkt en rekke forskningsspørsmål angående foreldrenes holdninger, bekymringer og involveringer rundt barnas bruk av det digitale læringsverktøyet iPad. Det har også blitt forsket på foreldrenes tilrettelegging til et digitalt læringsmiljø hjemme, deres digitale kompetanse og motivasjon til å delta på barnas tilhørende læringsplattform gjennom skolen.

Gjennom en utforskende forskningsdesign har det blitt gjennomført både kvalitative og kvantitative metoder. Gjennom kvalitative strukturerte intervjuer deltok 4 grunnskolelærere. Disse intervjuene ble videre transkribert og analysert gjennom designemetoden affinitetsdiagram. Den kvantitative digitale spørreundersøkelsen ble besvart av 51 foreldre med barn på småtrinnet, og dette ble analysert gjennom datamatrisen som ble opprettet etter endt spørreundersøkelse

Studien viser at foreldrene har en rekke ulike og viktige roller i barnas digitale læring som det burde bli satt et større fokus på. Studiens hovedfunn er at tross høy digital kompetanse, motivasjon og engasjement er foreldrene fortsatt bekymret for barnas bruk av digitale verktøy, som iPad. Denne masteroppgaven avsluttes med å komme opp med et designforslag til løsningen på nettopp dette, og oppfordrer myndighetene og kommunene i Norge til å sette enda mer søkelys på foreldrenes involvering fremover.

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Clarification of consepts

Related to theory

Domestication theory: Is a method used to describe how different innovations and new technology are accepted, rejected, and used by individuals (UIO, 2020).

ICT: Abbreviation for information and communication technology (Store norske leksikon, 2020).

Digization: Is to facilitate the generation of digital information and utilization of the information using information technology (Dvergsdal, 2021).

Digital technology: Electronic tools, systems, digital devices, and resources that generate, store, share, and process data (Victoria State Government, 2019).

Digital learning: Learning with digital technologies in education.

Digital tool: Tools characterized by electronic and especially computerized technologies such as electronic hardware and software (Rosland, 2019).

Digital learning tool: Any instructional practice that incorporates digital tools in key tasks to support pupils learning outcomes (IGI Global, n.d.).

iPad: In this thesis, the word iPad is used as an umbrella term to describe digital tools such as chrome book, digital learning boards, and tablets.

Learning platform: A digital learning platform, also called a learning management system (LMS) is a system to manage users, organize learning content, facilitate individualized teaching material and communicate with pupils, teachers and parents (Store norske leksikon, 2021).

Udir: Directorate of Education, is responsible for the development of kindergarten, primary school and upper secondary education (Udir, n.d.e).

FUG: National and independent body for the Ministry of Education to ensure that the parent´s voice is heard in school political matters (Foreldreutvalget for grunnopplæringen, 2021).

Corona pandemic: Worldwide outbreak of infectious diasease covid-19, cause by a coronavirus (Tjernshaugen et al., 2022).

Related to design

Design proposal: When the design proposal are mentioned, it is a reference to the upcoming proposal based on the conducted findings.

Personas: A persona is a fictional character, created to describe a typical user (Baxter et al.,2015).

Scenarios: Scenarios are stories designed to see how users might act to achieve a goal in the design (The Interaction Design Foundation, 2019).

Prototype: A realistic sample version of the final design product to identify and solving the user pain points trough.

Iterative process: Research technique to optimize the solution trough trial-and-error style cycles (Indeed Editorial Team, 2021).

Affinity diagramming: The affinity diagram technique was used to get an overview of user insight (Preece, Sharp, and Rogers, 2015).

Contents

Introduction

1. Introduction

In this thesis, the domestication theory will be used to understand how the iPad has been acquired by parents in their everyday life with their children, how they have become part of everyday life in routines, and spatial arrangements, and what rules are negotiated around their use.

1.1 The thesis´ background

In 2017, the digitalization strategy for the primary and secondary education sector (Future, renewal, and digitalization 2017-2021), was published by the Ministry of Education. The background of the strategy was that most people today are dependent on the usage of digital technology, for participation in society and work life. The technology we use today will change rapidly over the coming years (NOU 2017: 8). The Norwegian government believed that primary and secondary education is the foundation of all further education and development. This digitization strategy is therefore a part of the government's work to manage the opportunities in digitalization. Through the strategy, they want to help the schools to make better use of digital aids (NOU 2017: 8).

This digitization strategy led to huge engagement from parents, who were already trying to reduce the amount of screen time for their child at home, and then realized that the digitalization of the school brings with it, even more screen uses for their children. The digital learning tool iPad has become a central part of most people's everyday lives, including children, both at home, and now in teaching and schoolwork.

In 2020, the Ministry of Education communicated a plan of action for digitization in the primary and secondary education sector. In this plan (NOU 2020: 12), it was presented that the work towards digitization in the education sector is long-term. So far, pupils' digital competence has received an important boost through subject renewal. The plan of action also describes challenges particularly related to the digital infrastructure, privacy, knowledge, and the school's competence. The measures respond to some of the challenges that the municipalities themselves have provided input on. In this plan, it was also revealed that the ministry is working towards a new digitalization strategy, which will apply later in 2022 (NOU 2020: 12).

These guidelines from the government considering digitization has not only had a great impact on the pupils but also the teaching staff at the different elementary schools. However, one group that can then often be forgotten is the parents, who also have a very important role in the child's learning. It`s important that the digital competence can be extended so that the children can receive the follow-up they need at home, and that the parents have a basic understanding of digitalization to motivate the child to do school work.

1.2 Motivation

Since society understood that digitization in primary school was getting on the agenda and was going to be an even more central part of children's daily school lives, big engagement followed along. Numerous articles were written in newspapers across the country, debate posts, social media posts, and discussions around. This was, and still is a controversial topic, which is engaging many people, and thus makes it important to do more research about the important role of parents in the topic.

When I saw the dissatisfaction in the headlines about digitalization in primary school. This engaged me and that is why the master´s thesis is exploring exactly this topic. Technology has come to stay, and I strongly believe that if designers focus on utilizing it in the best possible way, great, and important advances can be achieved. The right design for the right person can have a major positive impact on quality of life. Something that engages is the amount of skepticism that new technology, especially among children, is met with, and probably still is, and it is important to learn and acquire knowledge about today's technology.

Children are the future, and it is today's children who will carry the technology forward. It is therefore very socially relevant to focus on the interaction between the children and the digital world. It is thus important to promote what positive technology does, and by including the children's parents in the process of understanding and accepting. The use of digital tools in learning can be very effective and useful, as long as it is used in a way that as many as possible can benefit from the tool. More research is done on this in the background chapter.

Debated headlines in Norwegian newspapers and websites for those who were against 1:1 iPad in primary school.

No, children do not need iPad.

- Dagsavisen, 2019

Want a debate about Ipad in school.

- RBNETT, 2022

Wanted to change school when his son came home with an Ipad.

- Aftenbladet, 2020

The tablets occupy Norwegian classrooms. No one knows if the children learn more or less with them.

- Aftenbladet, 2019

**Digitization in schools -
Now parents are suddenly worried.**

- Dagbladet, 2019

Do children learn more when schools introduce the Ipad? No!

- Aftenposten, 2019

Tablets at school - Turns on the tablet alarm.

- Dagbladet, 2020

Do children get poorer social skills from a lot of screen time?

- Forskning, 2020

Yes to pencil and paper at school - no to more screen!

- Sarpsborg arbeiderblad, 2019

1.3 Expectations in findings

Trough the domestication theory, a method used to describe how different innovations and new technology are accepted, rejected, and used by individuals (UIO, 2020), it will be investigated how the introduction and usage of digital tools, and the understanding of the digital learning tool iPad is in households of parents with children in Norwegian primary schools. It will be looked more closely into how the iPad is used as a digital learning tool and how digital learning is for the benefit of children and parents in the digital world we now live in. It is assumed that digitization and technology are not something that everyone finds equally easy to relate to, and it is not certain that parents feel that they have sufficient digital competence to be able to follow up on their children's digital school work.

It is also assumed that the skepticism and debate that took place when the iPad was introduced in primary school (2017) may have changed and that there has been more understanding and acceptance as the tool has been in use for some time, but it is also expected that there are exceptions that are still against the use of digital tools such as the iPad in school.

The thesis is based on the fact that the iPad in primary school as a digital tool is something that will be used in the future. Furthermore, it is expected that the thesis provides experience in insight work and analysis and academic thesis writing.

1.4 Problem statement

Parents are a group that is not as often mentioned in digitalization in school contexts, although they have an incredibly important role in children's learning. This master's thesis will therefore look at the parents' perspective. The target group is therefore parents with young children in primary school (1st to 4th grade).

This project aims to find out the role of parents in children's digital learning, from a domestication theory perspective.

1.5. Research goal

Children are the ones who will take over the society we live in, and they must have the opportunity to be able to unfold on the technological agenda. However, parents are part of the child's development and play a large and important role within this theme. It is thus important that the parents do not hold back the child's learning due to a lack of knowledge and skepticism. It is therefore relevant to include the parents in the children's digital school life and give parents the necessary digital competence to be able to help the child on their way in learning and to get the most out of digital learning.

It is relevant to look at the role of parents in conducting a great deal of research on precisely this. During the master project, the goal is to:

Determine a design proposal which may promote parents in their children´s digital learning in Norwegian primary schools.

The thesis will show how by carrying out insight-based work one can arrive at a practical solution proposal for parents with children in primary school who use the iPad as a learning tool.

1.6 The structure of the thesis

The master's thesis is divided into the following chapters:

Chapter 1 is an introduction chapter, where the background and theme of the thesis are presented. The problem, research questions, motivation, and goals are also explained here.

Chapter 2 is a background chapter where relevant literature, existing research, and theory are presented. The thesis is also put in a theoretical framweork. Here the reader is informed in more detail about the topic of the thesis.

Chapter 3 presents the methodology used in the thesis and how the methods are used for their purpose. Here the research design is also described.

Chapter 4 presents the results that have been obtained from the used methods.

Chapter 5 is about the discussion part of the assignment where the answers from the result part are drawn up against and analyzed against theoretical background. The research questions are also answered. In this chapter, the results are put in context and are discussed before the design proposal is addressed.

Chapter 6 in this chapter it is shown how the insight work can result in a proposal for a solution to the problem.

Chapter 7 completes the thesis by summarizing what the thesis has conducted. Suggestions for further work are also presented in this chapter.

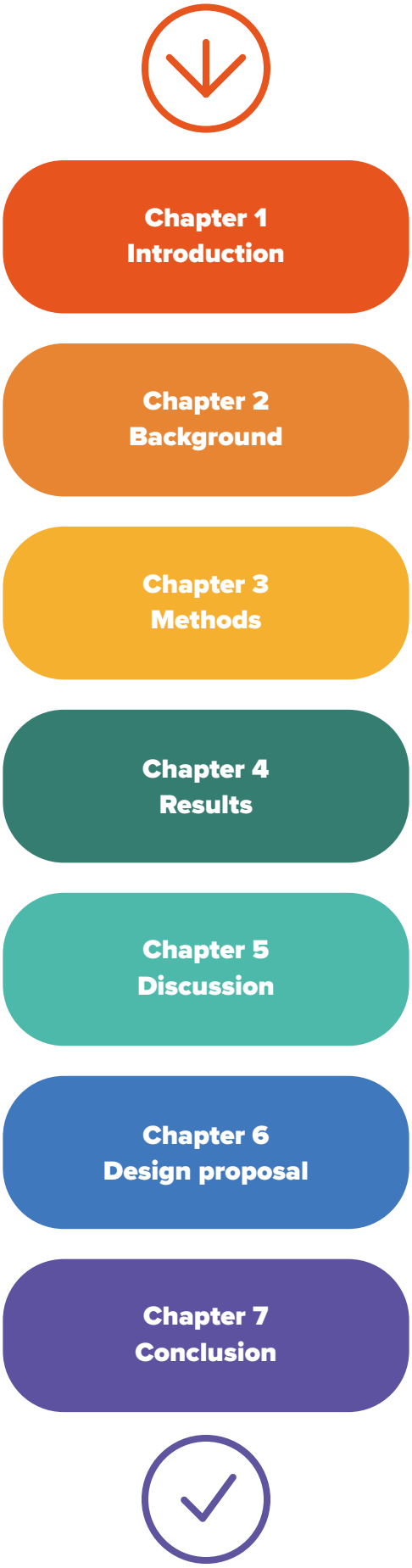


Figure 1. Structure of the thesis

Background

2. Background

In this chapter, the study is placed in the domestication theoretical framework. Relevant literature, publications and theory will be presented to explain the various concepts used in this dissertation.

2.1 The Norwegian school system

To justify the target group in this master's thesis, a small introduction to the Norwegian school system is necessary. Elementary school in Norway is free and compulsory schooling for children aged 6 to 16 years (Utdanning, n.d.). Elementary school consists of grades from 1 to 7. Elementary school is divided into primary school, 1 to 4 grade, and secondary school, 5 to 7 grade. After finishing elementary school the pupils go to junior high school, which is from 8 to 10 grade. When completing this level, the pupil chooses whether they wants to continue trough a study preparatory program, in order to further take higher education at a university or a college, or continue trough a vocational progam (Utdanning, n.d.).

This thesis is based on the idea that parents are more involved in the children's everyday school life the younger the children are, as older children often have more responsibility and are more independent. Therefore, the target group for this master's thesis is parents of children in primary school, 1 to 4 grade.

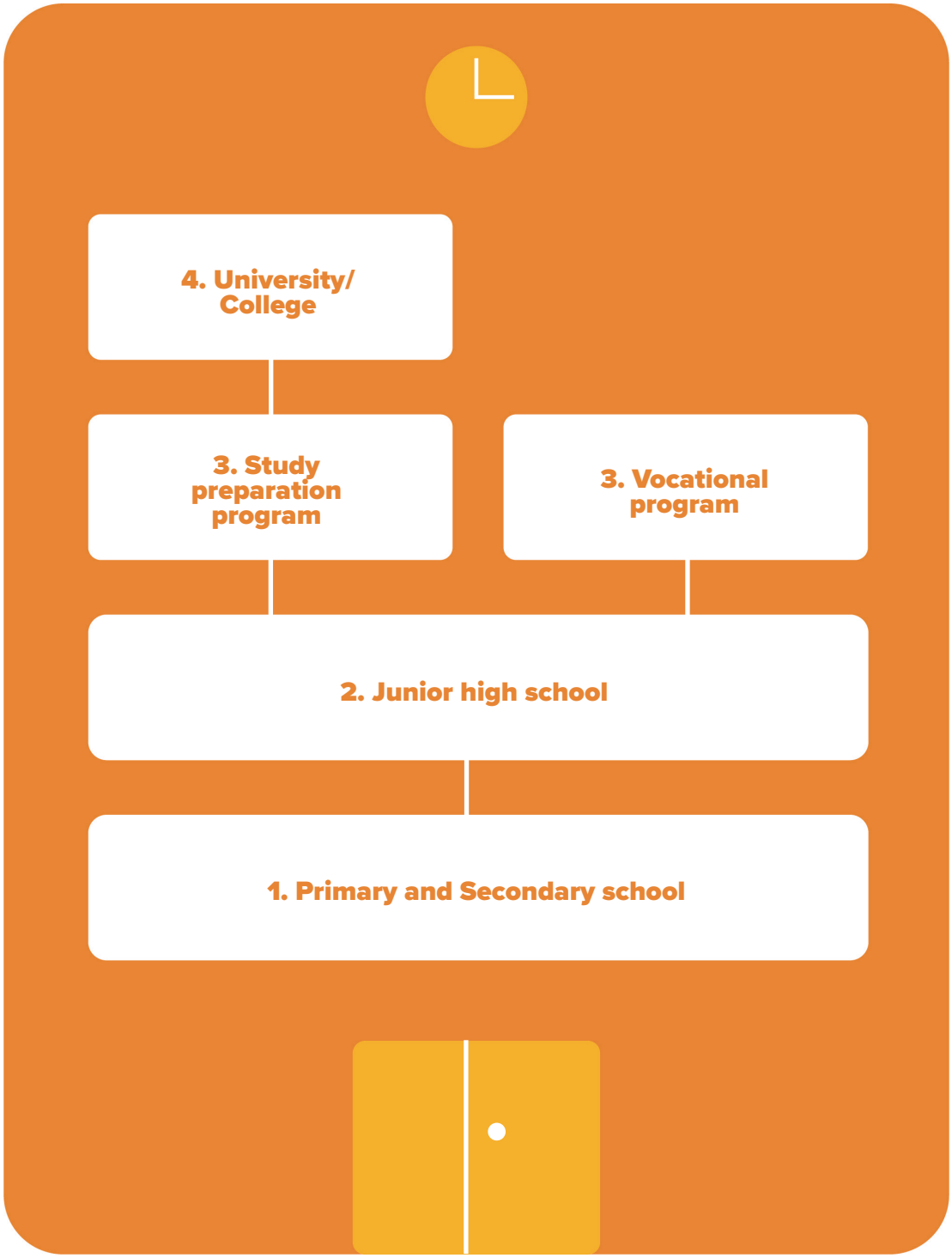


Figure 2. The Norwegian school system

2.2 Digitization in education: The debate

The debate on digitization in education has taken place in Norway since the digitalization strategy in primary school was first presented (2017). Critical questions have been asked in opposition to the technology being used to such an extent by children in primary school. It is the usage of the 1:1 Ipad, that each pupil has their own iPad for school usage that is in focus (Straker et al., 2018).

Education authorities encouraged children to use digital technology to prepare them to thrive in a digital world. The debate has largely engaged in articles and social media, but also among professionals (Straker et al., 2018). The opposition to technology is often perceived as a lack of acceptance. Those who perceive the technology can thus be divided into those who accept it and those who reject it (Rama Murthy and Mani, 2013; Straker et al., 2018). Those who reject wants to minimize the use of digital technology on children due to concerns for the children's physical health. The ones who accept on the other hand, wants to promote digital learning which includes promoting children's digital skills which are becoming more important in the future by creating patience in social interaction (Straker et al., 2018).

The phenomenon of technology rejection was dealt with by Rama Murthy and Mani (2019) where it was presented that rapid technological advancements often can daunt society to reject it, either partly or in whole. Straker et al. suggested that evidence is needed on how teachers can effectively help families develop digital technology practices that support children's health and development, which it is believed that the Norwegian Ministry of Education is working on in the future (2018). In 2022, a new digital strategy will be launched where:

> *"The measures in the action plan initiate important processes to strengthen the use of ICT in schools. The long-term measures in the strategy, together with the input we have received in the work on the action plan, will form the basis for the development of a new digitalization strategy that will apply from 2022"* (NOU 2020: 12).

The book, *digital guinea pigs* were recently published by Brochmann. He tried to find answers to why Norwegian school children were each given their own iPad and shows criticism of the solution (Brochmann, 2020). It was explained that when his child got an iPad, only instructions on how to charge it, protect the screen, etc. were presented, and he didn't get any reason why they got it or what it was going to be used for. See appendix 5 for an example of such contract.

Another statement was that he as a parent already was in a situation where they already have lots of screens that they try to limit use on and try to figure out how to manage everyday life, so it felt strange that they got yet another personal screen for the child. It is not the digitalization itself that is the problem, but the information, use, and knowledge about the specific digital tool (Brochmann, 2020).

This is thus very relevant in relation to the thesis, in order to be able to map whether this perception applies to more than Brochmann and whether it is the lack of information and inclusion that has created the skepticism.

Regarding the domestication theory and considering parents concerns and the skepticism about the negative impact usage of iPad can have on children, the first research question was advanced:

RQ 1: What are the parents' concerns when it comes to the child's use of the iPad?

2.3 Domestication theory

This study is grounded in the domestication theory in order to investigate the role of parents in children`s digital learning at home. The domestic approach was first suggested by Morley and Silverstone (1990). Furthermore, in upcoming numbers of publications during the following years, Silverstone developed the theory of domestication, together with a variety of different co-authors (Silvertsone, 1994). The domestication theory takes a look at how media technologies become subject to social and cultural shaping, or in some cases re-shaped by their users (Silvertsone, 1992).

The domestication theory is a method used to describe how different innovations and new technology are accepted, rejected, and used by individuals (UIO, 2020). Domestication is about investigating the introduction and usage of media technology in modern family life and understanding digital technology in households (Haddon, 2018). Research on the domestication theory of ICTs has shown that there are typically processes of becoming familiar with the different devices before actually acquiring them (Haddon and Vincent, 2014; Haddon, in press). Often the children are familiar with the use of the iPad at home before using the iPad in school gatherings. The domestication theory provides a framework that allows one to analyze individuals' media practices and the everyday dynamics of families.

The home has a privileged position within the theory since this is the dominant place where everyday life takes place, where activities are initiated and practiced consolidated into rituals. Young children are often first introduced to digital technology at home, by their parents. The theory provides a good starting point for understanding young children's early use of digital media and practice (Sandberg et.al., 2021). According to the theory, digital units and technology have an impact on family members' routines and behaviors, but technology is also shaped by family interactions and meaning-making (Sandberg et.al., 2021).

In the study about *European children and media* (2014), it was described that parents often want to either promote or limit their children's use of ICT, due to the perceived potential benefits or threats of technology. In research on how children domesticate their ICT, it is informed that children's use and social limitations are often regulated by external influences rather than adults. The adults often have views on what can be reached via mobile internet, and parents often draw up rules about when and where these devices can be used.

Domestication theory is in other words used to analyze how different media are introduced and integrated into society. In this thesis, it thus becomes relevant to see how the iPad as a learning tool was introduced and then integrated into the children's and parents' everyday lives.

In this assignment, the domestication theory will be used to find out, to what extent the perception of the iPad as a learning tool, has in the parents of children in primary school. The focus areae here is when they come home from school and will do homework on an iPad. The domestication theory will also be used to understand how the iPad has been acquired by parents in their everyday life with their children, how they have become part of everyday life in routines, and spatial arrangements, and what rules are negotiated around their use.

Children and domestication

Research on children and domestication (Haddon, in press; Lindeman, Svensson and Enochsson, 2021; Bober and Hynes, 2018) has often documented how parents interact with children. Initially, the literature focused on strategies parents could use to mediate children's use of ICT devices, first with television, and later with the Internet (Haddon, in press). In research that specifically asks how children domesticated their ICT (Sandberg et.al., 2021), the topic of social constraints have been central, where children's use of digital tools is regulated by the external influences of adults and parents. A relevant example is iPad (de Reuver, Nikou and Bouwman, 2016). As mentioned, concerns about children and their relationship to new technology have become increasingly apparent as the use of technology and digital tools has increased among children (Haddon, in press).

Although when parents identify their concerns about ICT, after either being influenced by others who have experienced worrying events or experiencing it for themselves when children domesticate those same technologies, they are also aware of these societal concerns (Haddon, in press).

Previous research using domestication theory

In 2021 a study from a *domestication theoretical perspective about digitalization in early childhood education* was published (Lindeman, Svensson, and Enochsson, 2021). The study states that there are different opinions when it comes to the usage of digital tools among children, where some people think digital tools should not be introduced until we know more long-term effects of the usage and may preclude adverse effects. However, it is also highlighted that many teachers find digital technology useful in education and for learning purposes. It is presented that the debate about using or not using digital tools among children in education is no longer relevant, since it, in countries like Sweden, is a tool used in very many schools. Lindeman et al. instead thinks that it is time that the debate now should be focused on how the teachers can prepare the children for participation in a digital society (Lindeman, Svensson, and Enochsson, 2021). Teachers lack in-service training which for the teachers makes it harder to domesticate the digital tools (Lindeman, Svensson, and Enochsson, 2021). The study concludes that the teachers will make an effort to bring digital technology into education, and with the lack of competence, they will work to make a change for both themselves and the children by combining pedagogical digital competence with their learning development. (Lindeman, Svensson and Enochsson, 2021).

In the research *Toddlers' digital media practices and everyday parental struggles: Interactions and meaning-making as digital media are domesticated,* Sandberg et al. show finding in Swedish findings from a European comparative study on 0-3-year-old children and their digital lives with domestication theory (2021). The article focuses on young children's acquisition of digital technology, and the parents' discussions about the negotiation between the parents about the introduction of digital media practices in early childhood, as well as the choice of content and monitoring of children (Sandberg et al., 2021). Parents often have ambivalent feelings about digital media technologies because they often find it difficult to decide what is best for their children. This study (Sandberg et al., 2021) shows that domestication of digital technology in early childhood is more challenging than other studies have shown before. Sandberg et al. use observations as a research method in this study where families with parents and young children were observed by digital technology (2021).

In another study, *Tools for Entertainment or Learning? Exploring Students 'and Tutors' Domestication of Mobile Devices,* Bober and Hynes examined attitudes to and use of mobile devices. The study (2018) used the approach to the domestication of technology to understand how mobile devices have been acquired by users in their everyday lives. The research focused on network learning and focused on the ICT aspect of network learning. The study used qualitative semi-structured interviews of teachers, as well as a focus group with pupils. It was presented the findings that teachers used their mobile devices in teaching practice in innovative and useful ways, while pupils had a less well-defined understanding of the benefits of mobile devices (Bober and Hynes, 2018).

These studies are useful background for this thesis to gain insight into how studies deal with similar topics from a domestication perspective. Important findings from these studies are that it is time that the discussed debate should now be focused on how teachers can prepare children for participation in a digital society (Lindeman, Svensson, and Enochsson, 2021). It was also informed that parents often have ambivalent feelings about digital media technologies because they often find it difficult to decide what is best for their children (Sandberg et al., 2021). This insight shows that it is important for children to participate in the digital world and that many teachers find it useful, but according to the studies, parents have an ambivalent relationship with technology around children. This is examined in more detail in the thesis.

Phases of domestication

Domestication is most often described as a process of four phases: appropriation, objectification, incorporation, and conversion (Silverstone, 1994). Through these four phases, this thesis wil look into, and describe how digital learning and digital learning tools, especially iPad is accepted, rejected and used by parents.

Appropriation: In the first phase the technology is integrated into everyday life and adapted to daily practices. The acquisition of technology is the main activity or attitude. The digital tool should be acquired in a way to be accessible to the user, and be given a physical and mental place (Silverstone, 1994; Lindeman, Svensson, and Enochsson, 2021). In this phase perceptions, a reason for the acquisition, and what the acquisition is expected to yield are included. In this study it will therefore be relevant to investigate parents´ attitudes towards digital learning tools such as the iPad, and how and why these are integrated for parents at home.

Objectification: In this phase, the user and the environment are changing. The user must find the digital tool practical and useful in their own daily lives. The digital tool is going from being a thing to becoming something personal. Objectification is trying to capture the way the values are being expressed through the presentation of the new digital too, and possible concerns and encouragements obtains. It also involves where it is located in the house and how it fits into the time structure together with what competence the user has to use the tool. For the purpose of this thesis, the look at possible concerns parents may have toward digitization in primary school is relevant to the objectification phase (Silverstone et al., 1992; Lindeman, Svensson, and Enochsson, 2021).

Incorporation: The incorporation phase emphasizes how ICT is used, and the time aspect is central. Silverstone suggests that for an artifact to be incorporated, it should be used actively, as in the performance of a task (Silverstone et al., 1992; Lindeman, Svensson, and Enochsson, 2021). An example of incorporation is the level of involvement parent´s have when it comes to their childrens digital learning tools.

Conversion: In the conversion phase, the digital tool is becoming an object which redefines the user´s relations to the world around them and its usage in the household (Lindeman, Svensson, and Enochsson, 2021). This phase is about how the digital tool is used in different arenas and whether one takes part in its use. For the purpose of this thesis, the understanding of how parents are integrated with the use of digital learning tools and which motivations have been formed behind is relevant to the phase of conversion.

2.4 Digital technology and digitization

Digital technology is electronic tools, systems, devices, and resources that generate, store, share, and process data. Examples of digital technology are mobile phones, online games, and social media (Victoria State Government, 2019). Digitization is how people use digital technology in a way that can innovate, simplify and improve. Through digitization, citizens can use devices that are efficient and reliable (Kommunal- og moderniseringsdepartementet, 2014).

Digital technologies are a big part of our daily lives in 2022. There are both positive and negative aspects. The Norwegian Media Authority uncovered that 26% of children aged 9-18 who own a mobile device have experienced that someone has been mean to them or bullied them online (Medietilsynet, 2020). While as many as 76% reported that they solve problems at school faster by using digital tools (Fjørtoft, 2020). The use of digital technology can be explained by how society views the technology (Jensen, 2019).

We in modern society are dependent on today's technology. There is no doubt that technology has come to stay, and it is constantly evolving. Through digitization, IT and digital solutions will be used to further develop and facilitate. While several studies have focused on children and digital technologies in the learning environment (e.g. Kmecová, 2019; Raja and Nagasubramani, 2018; Gözen et al., 2021), few have investigated the role of parents in child's digital learning (Willis and Exley, 2018).

Regarding the domestication theory and based on the literature on digital technology and digitization, the following research question was advanced:

RQ 2: What are parents' perceptions of digital learning?

2.5 A digital world

Today's children grow up in a fully digital society, also called a digital world. Digital technology has changed the world, and it is increasingly also changing childhood since children are daily users and the digital future (UNICEF, 2017). Young children should be prepared to manage and master their technological future (Livari, 2020). The young generation should take action and look with a critical view on digital technology and should adopt a critical view towards digital technology and consider how it can be used to make the world a better place (Livari, 2020). An education system is a natural place for implementing such learning.

Growing Up With Technology explored the role of technology in the everyday lives of young children by describing experiences at home and in school (Plowman, Stephen, and McPake, 2010). Factors such as cultural practices, the people in the children's lives, and the material resource can show their encounters with technology. The discussion of children's usage of technology led to, as mentioned, a huge debate, and people thought children should be competent users of digital technologies to avoid disadvantages and to become assured and effective members of the digital society (Plowman et. al, 2010). Skills around media and ICT are daily necessities and make it possible for children to search, organize, evaluate and produce information using technology (Forkosh Baruch and Erstad, 2018).

Even if children grow up in a digital world, it is up to each parent to decide in which amount their child should be involved in the digital world. Where families are enthusiastic users of technology, parents encouraged their children's engagement with computer activity, and the children would naturally develop competence with technology. However, according to Plowman et. al many parents have mixed attitueds about the ways technology can be either beneficial or detrimental to their children and described uncertainty about the role it should play in their family (2010). Parents, in general, are concerned with the risks and expectations that follow along with the usage of digital technology (Sandberg et.al., 2021). Upbringing in a digital world follows with a responsibility on the adults around the children who must verify that children use these devices and opportunities wisely.

Studies with young children (Livari, 2020; Forkosh Baruch and Erstad, 2018) show the importance of ICT for developing higher-order thinking skills. Technological, electronic, computational, and screen-based tools can be a part of children's lives in the same way as non-digital devices and tools. Even young children can gain benefits on different levels (academic, intellectual, social, and emotional) when experiencing different kinds of digital and non-digital media (Forkosh Baruch and Erstad, 2018).

Toddlers' digital media practices and everyday parental struggles describe that parents are feeling responsible for their well-being and raising their children into digitally literate citizens. Sandberg et.al states that children are not a homogeneous group, and they grow up in families with different backgrounds with different moral economies. The variation of this is an important factor to take into account when attempting to get the bigger picture of young children and digital media practices and parental struggles (2021). This is relevant concerning the issue of involvement of parents, where parents come from different points of view with different backgrounds and have different needs and knowledge.

On the basis of the domestication theory and the parents' involvement in their child's digital development, a third research question was advanced:

RQ 3: How do parents get involved in their child's digital schoolwork?

2.6 Media habits among children

With this in mind, it is relevant to have knowledge about the children´s media children's media habits with screen use and digital tools. The number of time children spends using digital devices is rapidly increasing along with the new instantly accessible and portable technology. The avreage users of mobile devices are becoming younger, and they can use their mobile devices at any time and everywhere for different kinds of purposes like playing games, schoolwork, chatting with friends, and searching for information on the internet (Hosokawa and Katsura, 2018).

The Norwegian Media Authority published in 2020 results from a survey that sample information about media habits for parents and their children. In the survey about parents and media, parents answered questions about their children's media use. About 2,000 parents with children aged 1 to 17 years old participated in the survey (Medietilsynet, 2020). Below are the most relevant findings:

> From the age of 11-12, almost all children have their own mobile phone. Almost half (49 percent) get their first mobile before the age of 9.
>
> 70 percent of the parents state that the child has access to television. Furthermore, 55 percent have access to a game console, and 46 percent have access to a computer.
>
> Among the youngest children (1-4 year-olds), 41 percent have access to tablets. Of children with access to tablets, 27 percent started using this before the age of 7. At the age of 10 years, 90 percent of children start using tablets according to their parents (Medietilsynet, 2020).

In the survey, it was emphasized that children spend an enormous amount of time on digital media. They have easy access, not only at home but also at school. Again, I demand the focus on the parents. There is a lot of talk about the importance of parents' participation in children's screen use, but how should parents be able to guide children to make good digital habits, if they do not have the necessary knowledge? The next section looks more closely at the importance of digital competence.

2.7 Digital competence

To assist and guide children, the adults around the children (parents and teachers), should know how to use digital tools responsibly. Udir (Directorate of Education) explains the phenomenon of having digital competence that the user should be able to use digital resources appropriately and responsibly to solve practical tasks (n.d.b). Digital competence is being able to understand a set of knowledge, skills, abilities, stances, and values that an individual needs to use digital technologies and digital media for usage (Kmecová, 2019). Working with digital tools provides opportunities for new and changed learning processes and working methods, but also places increased demands on judgment (Udir, n.d.b).

Digital competence is based on the following characteristics (European Commission, n.d.; Udir, n.d.b; Kmecová, 2019):

1. Information and data literacy:
Being able to articulate information needs, locate and retrieve digital data, information, and content, and being able to evaluate their relevance. It is also about storing, managing, and organizing digital data, information and content.

2. Communication and collaboration:
Being able to interact, communicate, share, connect and collaborate in a digital environment. And to cooperate through digital tools and participate in society through digital services and manage one´s digital identity.

3. Digital content creation:
Having the ability to create new content, or edit old content using media creatively and respect and understand copyright and licenses. It is also about improving and integrating information into an existing body, and knowing how to give understandable instructions to a computer system.

4. Safety and security:
Manage to secure data, and protect personal data and privacy in digital environments. Being aware of the environmental impact of digital technologies and their use, and own presence in the digital world.

5. Problem-solving:
Identify needs and problems, and by using digital sources using technologies for solving them and identify digital needs. Being able to use digital tools to innovate processes and products and keep up-to-date with the digital evolution.

Regarding the domestication theory severeal research questions was advanced based on the relevance and importance of digital competence and the appropriation of new technology:

RQ 4: Do parents have enough basic digital competence to be able to assist their child in digital schoolwork at home?

RQ 5: How do parents appropriate technology at home?

2.8 Digitization in primary school

There is a big difference between the tools that were used in the past, and the tools that are used in school today. The transition from analog to digital tools has been large, but also in time with the development of technology. To put it bluntly, before, books, sheets, pens, and paper were used, now it is a screen and an iPad. Before, the weekly school plans were handed out on paper, now they are available on a digital application. Teachers stand with an iPad and control images on a digital whiteboard instead of swapping foil sheets overhead. In other words, there are great differences between school before and now.

Brochmann presents an example of the contrast between schools before digitalization and the digital school. Earlier, pupils would write information by hand and draw with colored pencils. Now the same task would be solved by downloading the same elements from the internet and copy-pasting them into a digital sheet on the iPad screen (2020).

In the previously mentioned action plan for digitization in primary education (2020-2021) the strategy presented two main objectives:

> *1. Pupils should have digital skills that enable them to experience life mastery and succeed in further education, work, and community participation.*
>
> *2. ICT must be utilized well in the organization and implementation of the conduct of education to increase pupils' learning outcomes (NOU 2020: 12).*

The municipalities' digitization of primary schools has taken place at different rates, without national management. There are no exact figures on the number of digital units in primary school, but it is known that more and more primary school pupils get their digital units in school. A sample survey shows that 81% of primary school pupils in the 100 largest municipalities in Norway have received this. In 65 of these municipalities, all the pupils in the entire municipality each have their digital unit. In primary school, pupils often use iPads in the first grades, while laptops are more often used by older pupils (Udir, n.d.a)

2.9 Digitization in learning

In order for parents to be able to contribute to their children's digital learning, it is important to know what digital learning is.

In a study (2019) with focus on digitization in education, the importance of using digital technologies in the teaching process was presented. Learning with digital education should in a natural way combine formal education with informal learning. The goal for digital learning should be an open school environment, and schools today that are isolated and do not take in new technology will not survive in the digital and online world of the 21st century (Kmecová, 2019).

Impact of modern technology in education states that technology has revolutionized the field of education. Learning with digital tools is now easier to both impart knowledge to teachers, and for pupils to absorb the information. The usage of technology has made the process of teaching and learning more enjoyable for both many teachers and pupils (Raja and Nagasubramani, 2018).

Modern technology can be used in a learning context with examples such as internet connection and round-the-clock connectivity, using projectors and visuals, and online learning, like during the corona pandemic. There is also a great focus on the impact of ICT on education. In both the teacher and the pupil's favor, ICT tools help in the phase of active learning, collaborative learning, creative learning, integrative learning, and evaluative learning (Raja and Nagasubramani, 2018).

Digital technology in education has both advantages and disadvantages. (see, for example, Raja and Nagasubramani, 2018; Kmecová, 2019; Mantilla and Edwards, 2019)

Positive impacts: Better teaching and learning through technological developments such as digital cameras, projectors, software, computers, visualizations, and digital media. The positive impact is also that the teachers and the pupils can meet through video conferences and have a digital classroom. Digital learning gives very few geographic limitations, and especially during the corona pandemic distance learning and online education have become very important in the education system today. Research also shows that pupils are more excited to learn when using digital tools in learning, and the usage decreases paper costs and promotes the concept of a green revolution. It is also easier to present the work, in the sense that you show things on a big screen rather than holding up a small book.

Negative impacts: The digital tools such as iPad and computers can not take the place of learning writing skills, but the writing skills of today's young generation have declined quite tremendously. It can also be harder to hold focus in the way of being connected to the internet world and the concentration can be harder to hold on to. It is also very expensive to install such technology. Google, copy and paste is also probably not a cognitively good way to learn to write.

Digital learning among teachers

Digitization in schools places great demands on digital competence among teachers. According to the government's digitalization strategy, the goal is that by 2022 teachers will have a high level of professional digital competence, as well as strengthening teachers competence in digital interaction and distance learning and competence in programming and algorithmic thinking (NOU 2020: 12).

SINTEF conducted a survey among teachers in connection with homeschooling in the spring of 2020. Even if the closure and the transition from a normal school environment to a digital school life happen suddenly, Fjørtoft describes that Norwegian schools, pupils, and general work-life were prepared. Norway is at the top in Europe in the usage of digital tools and Internet use, where 93% have internet access and a computer at home (2020).

When the corona pandemic was at its worst, teachers, like many others, suddenly found themselves under a pressure to act digitally. The report presents several different digital resources teachers use during this period. Resources such as online teaching through zoom, digital learning resources, social media, other people's videos, own pre-recorded videos and quiz tools, etc. were used by teachers in digital learning. Teachers also took a position to how often they used digital resources, with 64,9% of teachers saying they practised live teaching daily, and 50,1 % used digital resources found online weekly in the teaching (Fjørtoft, 2020).

Digital learning among children

In the study titled *Learning through digital tools in early childhood*, Gözen et al. assert that digital learning is about the pupils' usage of digital resources in the learning environment. These can be digital tools such as computers, virtual reality (VR), digital games, or mobile devices, such as iPad. Using these digital tools along with physical movements it can significantly contribute to pupils ' cognitive learning (2021). Children quickly acquire the skills needed in the usage of digital tools, and today's children who grew up in the digital world often take things easier than their parents (Jernes, Alvestad, and Sinnerud, 2010). Children often have knowledge of the tools presented in school before they even start at school. In addition they learn from each other by exploring, discovering opportunities, and trying and failing (Jernes, Alvestad, and Sinnerud, 2010).

The right usage of digital tools has in many cases a positive impact on the children's learning, such as developing creative ideas, cognitive skills, academic achievement, and problem-solving skills (Gözen et al., 2021). It is recommended that the teacher should have control of the media device usage of the pupils, and let both the pupils themselves and the parents know and be aware of for what purpose they use their media devices. It then can be provided that pupils use technological devices efficiently in digital learning (Gözen et al., 2021; Livingstone et al., 2018).

Digital learning among parents

Parents feel that they are not able to participate efficiently in their children's school-based learning when it comes to digital learning (Willis and Exley, 2018). The relationship between parents, pupils, and schools that promote learning, well-being, and high expectations for the pupils' success. Research also shows that pupils' outcomes improve when their parents are engaging in their children's learning (2018).

In contrast to the digital action plan from the Norwegian government (NOU 2020: 12), the parents of pupils in Australia (Willis and Exley, 2018) are described by the government as playing an important role in the children's digital school life. It remains to be seen whether the Norwegian gouvernment has something to learn here. The digitization plan of action there are only mentioned digital competence and follow up by school owners, school leaders, and teachers, and not at home.

In an article titled *Parenting for a digital future*, Livingstone et al. concluded that parents lack support for dealing with digital dilemmas, and in normal situations, adults also turn to their parents, but when it comes to digital tools, the older generation does not always reach out in this area, since they not are used to technologies the way the younger generations are. A generational gap is thus presented that leaves parents unsupported when it comes to significant issues (2018). On the other hand, digital technologies have in many ways increased the parent-school relationship by the number, range, frequency, and efficiency that improved connection and enabled productive parent-school relationship (Willis and Exley, 2018)

It is no doubt that parents' involvement in their children's digital school life is important. Parents may be more involved in their children's education if they feel that it's a part of their role as a parent. Parents may also feel to be more involved if they have the knowledge and digital competence to be helpful, and if their children's school makes them feel included and welcome in the learning environment (Sonnenschein, Grossman, and Grossman, 2021).

This was also highlighted during the corona pandemic, where learning among parents and expectations of them has probably risen considerably when school was conducted at home in virtual classrooms, and parents had to play a much larger role in learning, compared to when the children were physically at school every day.

2.10 iPad as a digital learning tool

The iPad was first launched in 2010 and is a tablet developed and designed by Apple. The iPad was primarily designed as a platform for audiovisual media, books, movies, music, games, and the internet (Føreland Johnsen, 2015). As mentioned, the iPad is being used as a digital learning tool that is used in several schools today. The majority of 1:1 implementation models are driven by a collaboration consisting of the state (national education authorities), the municipal sector (school owner, school management, and teachers), and the providers of digital solutions and services (NOU 2020: 12).

In research about iPad in the classroom it is stated that iPads in many ways can support seamless learning, by easily allowing learners to switch learning contexts, from formal to informal or personal to social, and to take control of their learning (Clark and Luckin, 2013). iPad can in many ways motivate and engage pupils, and keep their concentration and interest in the content for longer. Clark and Luckin present research that suggests that the adoption and use of iPads in and beyond the classroom are allowing pupils to enhance their learning in ways that were not possible before digital tools were being used (2013).

It is reported by parents, pupils, and teachers that communication features, accessibility, and routine availability of iPads in the classroom and the house of the pupils make the communication between teachers and the pupils, and the school and the parents easier and more seamless (Clark and Luckin, 2013).

Based on the research conducted on iPad as a digital learning tool in, another research question was relevant put in context with the domestication theory:

RQ 6: How is the iPad used as a digital learning tool in Norwegian primary schools?

2.11 Home and school collaboration

A term that is used in connection with parents' inclusion in school is home and school collaboration (Udir, n.d.d; Jenssen and Faugstad, 2019). This is a term about the relationship between home and school, as well as their relationship (Udir, n.d.d). A good collaboration between teachers and parents is about co-creating a common understanding of pupils' development. Today, parent meetings and development talks are known as the collaboration between the school and teachers, and the home. This is something that is required by law and teachers must at the beginning of each education year conduct a parent meeting where the parents receive information about routines, school, education, and other relevant information (Regulations to the Education Act, 2006). Developmental talks must also be conducted at least twice a year, where parents gain insight into their children's behavior, well-being, and development at school from the teacher's point of view (Regulations to the Education Act, 2006). These parent meetings and development talks are described as political tools to be able to develop and maintain a parent collaboration and have a basis for a good upbringing environment for the pupil from the school's perspective (Jenssen and Faugstad, 2019).

Home and school collaboration are about a mutual dependence where parents and teachers together must solve the tasks that occur related to the children's learning and development (Udir, n.d.d). However, challenges may arise in collaboration with the homes when the parents experience that school and home have different values or assessments of the same phenomenon. It is the parents who have the main responsibility for the upbringing of their children, but this is also a collaboration with the school, in that it is where the children spend every single day, and the teachers have a great impact on the children's upbringing (Udir, n.d.d). The school shall assist in the children's development and involve the parents in what happens at the school. This means that the school must facilitate good parent collaboration and inclusion, as well as clarify what this collaboration is about.

Udir claims that there must be strategies in the schools that enable the parents themselves to be involved in making important decisions about school policy (n.d.d). It is also claimed that parents who experience that they are allowed to be involved in various decisions at school can often feel ownership of what is going on (Udir, n.d.d). The school must thus ensure that parents have the opportunity to participate in relevant decisions (Jenssen and Faugstad, 2019), which is very relevant in accordance with this master's thesis where it is perceived that parents often remain on the sidelines when it comes to children's digital learning.

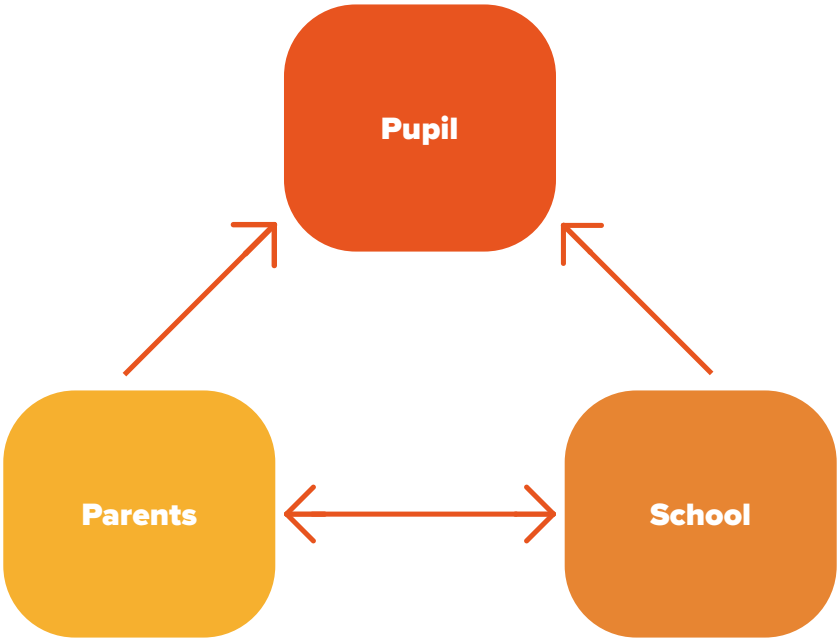


Figure 3. Home-School collaboration

2.12 Parents role

Parents have an important role in their children's digital lives (Edwards et al., 2018). Parental involvement is considered to be critical for children's success in the usage of digital tools (Sonnenschein, Grossman, and Grossman, 2021). It is encouraged that parents learn about the digital technologies their children are using. The parents should be confident in helping and facilitating their children with schoolwork at home on digital tools such as the iPad (Mantilla & Edwards, 2019). Parents should teach children how to use digital technology, and to create an understanding between families, services, and educators about the usage of digital technologies by the adults in front of their children (Edwards et al., 2018).

Children learn by participating and being guided. It should be built a digital competence practice for children where they can gain knowledge from adults and peers through talking, conducting, and stance taking by displaying social and cultural references about how to use different digital tools (Aarsand, 2019). If children use digital devices without being monitored, the improvement in the children's development process will slow down (Gözen et al., 2021).

2.13 Parents motivation

For parents to be able to use their role sensibly, in addition to having digital competence, they should be motivated to participate in their childrens learning and adapt new technology. It is therefore relevant to understand how motivation works and especially around technology motivation as parents.

Motivation is related to self-confidence. People with high self-esteem have a stronger level of motivation than those with lower self-esteem. Self-esteem affects motivation through behavior, endurance, and achievement (Sun, 2008). Several motivational inputs can influence your attention and decision-making process. The biggest motivation to achieve something is whether it is something fun, or satisfying to achieve (Taylor et al., 2018). Those parents who have low self-esteem when it comes to using digital technologies often have little motivation to try to use them. It is more motivation to do something you know you can do, rather than not do (Sun, 2008).

In the context of motivation and digital technology, there is a relationship between digital technology, acceptance, use, and satisfaction (Mitchell et al., 2012). This means that for parents to be motivated to take part in their children's digital learning, they must to some extent accept the children's use of the iPad. In addition to knowing both the use of the tool, as well as finding satisfaction in the usefulness of the tool.

Regarding the domestication theory and according the importance of a motivating factor to be able to take part in digital learning, the following research questions are asked:

RQ 7: To what degree are the parents motivated to take part in their children's learning on digital platforms?

2.14 Brief summary of background chapter

In the background chapter, knowledge about, digital technology, the domestication theory, digital competence, school and parent collaboration, and the parent's role in the children's digital learning have been acquired. The thesis is now moving forward to the method chapter, which includes descriptions of used methods to answer the research questions that have been asked along the way. Through exploratory design, the qualitative method of interviewing is used to interview teachers in primary schools. By conducting the quantitative survey method, parents engage parents with children in primary school.

Methods

3. Methods

This thesis will take a closer look at how the iPad works in practice as a digital learning tool in Norwegian primary schools, as well as parents' attitudes and perceptions of their roles in their children's digital learning. In this thesis it will be shown how an insight work based on several research questions can result in understanding and a proposal for a concrete solution. Through exploratory design, the qualitative method of interviewing is used to interview teachers in primary schools. By conducting the quantitative survey method, parents engage parents with children in primary school.

3.1 Research design

Inspiration from previous research

In the study titled *Parents 'perceptions of e-learning in school education: implications for the partnership between schools and parents,* Siu-Cheung Kong aimed to examine parents' understanding and concerns about e-learning. A school-parent partnership was proposed with a shared responsibility to parents and schools (2018). The study was based on Hong Kong's pilot schools that implemented e-learning, where questionnaires and focus group interviews were conducted.

In this thesis, the research design and methods could have been invented for this particular master thesis, but in the presented study (2018), Siu-Cheung has done a similar piece of work based on e-learning as a holistic learning tool. A decision has thus been made to take great inspiration from the questionnaire in the study (Siu-Cheung Kong, 2018). Changes have been made adapted to this study so that it focuses on the use of the iPad as a learning tool, and not only e-learning in general (Appendix 4).

The study (Siu-Cheung Kong, 2018), presents that future studies can use the school-parents partnership to assess the effectiveness of home e-learning and guidelines to support children's learning at home, as well as the effect of holistic school policy formulation to address and alleviate concerns about e-learning.

It will thus be looked at whether this can be a relevant proposal on the issue as the study (Siu-Cheung Kong, 2018) claimed it would be informative to formulate a comprehensive school policy to meet parents 'concerns and improve parents' understanding of e-learning. This is something relevant to this master's thesis, where there is a lack of focus on parents' inclusion and role in the children's learning in formal contexts such as the government's digital action plan (NOU 2017:8; NOU 2020:12).

Selected methods

Using exploratory design, qualitative research (Baxter et al, 2015; Leedy and Ormrod, 2016) is first conducted, in the form of structured interviews. Here, the goal is to gain a general understanding of the topic by interviewing teachers in primary school. Furthermore, this data is analyzed and the information is used in the quantitative phase (Baxter et al, 2015; Leedy and Ormrod, 2016), and examined via a questionnaire (Cresswell, 2014; Baxter et al, 2015). Exploratory sequential mixed methods is a relevant research design in this study, where the qualitative data with teachers as informants provide a basis for a more systematic quantitative study, in the form of insights that provide appropriate questions for a questionnaire where the parents are respondents (Leedy and Ormrod, 2016). Illustrations is used to illustrate how the data was processed.

The main goal of the interviews with the teachers is to gain insight into how the iPad is used in practice in primary schools and the main goal of the questionnaire is to gain insight into the parents' role in the children's digital learning.

Rounds have been made about which term to use for the digital tool. Some schools use chromebook, and teachers have referred to the tool as a digital learning board. The reason why the term iPad is used to refer to the tool is that it is precisely the reference to the iPad that has been discussed in the media, which is the main inspiration of the thesis. Therefore, in this master's thesis, it is thus the term iPad used in this context.

Summary of research questions

To answer the following research questions, qualitative structured interviews were chosen as the method for gaining an overall insight from the teachers:

RQ 1: What are the parents' concerns when it comes to the child's use of the iPad?

RQ 3: How do parents get involved in their child's digital school work?

RQ 4: Do parents have enough basic digital skills to be able to assist their child in digital school work at home?

RQ 6: How is the iPad used as a digital learning tool in Norwegian primary schools?

To get answers to the following research questions, a quantitative questionnaire has been chosen as the method so that a wide range of parents is covered:

RQ 1: What are the parents' concerns when it comes to the child's use of the iPad?

RQ 2: What are parents' perceptions of digital learning?

RQ 3: How do parents get involved in their child's digital school work?

RQ 4: Do parents have enough basic digital skills to be able to assist their child in digital school work at home?

RQ 5: How do parents appropriate technology at home?

RQ 7: To what degree are the parents motivated to take part in their children's learning on digital platforms?

Some of the research questions are answered by a combination of both methods through relevant insights combined from both teachers and parents.

3.2 Interview

Interviews are a useful method for getting concrete information from relevant objects. Structured interviews (Østbye et al., 2013) were conducted to get answers to predefined questions, where the answer possibilities are preferably open. Still, the informants can have room to elaborate on their thoughts and opinions and have room to fill in more outside the given questions (Baxter et al, 2015; Leedy and Ormrod, 2016; Tomitschi et al., 2019). The weakness of this method is that the informants may feel that they are not allowed to contribute if specific questions arise that they have no basis for answering, rather than if they are asked to talk freely about specific topics. The strength, on the other hand, is that all the informants have the same starting point and that there is room to get in-depth, while at the same time answering desired specific questions. Behaviours and attitudes are also easier to understand when you can see the body language of the informant when they answer, and be able to ask follow-up questions (Cooper et al., 2014; Tomitschi et al., 2019).

Selection of interview objects

Even though the thesis´ main focus is on the parents, getting information from those who are experts about how the iPad is used in Norwegian primary schools, the teachers is a natural place to start. Children do not have the right to consent, and the thesis do not focus on studying or gaining insight from children, but they act as a third party based on informants' natural opinions, attitudes, and knowledge about the topic that concerns young pupils.

In this thesis, there are a total of 4 informants, teachers at the primary school level from first to fourth grade who are contact teachers at their respective schools in Norway. Time and place were planned through email in correspondence first to the principal or secretary, who forward sent an email to teachers who in turn re-contacted by e-mail, where further dialogue took place.

Of these, two interviews were conducted physically in the primary schools, while due to distance and practical reasons, the other two interviews were conducted digitally. This had little to no effect on the quality of the interview, however, the physical interviews could be perceived as a little less formal as both spokespersons were physically present.

Interview guide

An interview guide was created (Appendix 2) with several questions and sub-questions that were relevant to getting answers to the research questions.

The following topics are addressed in the interview:

- When the iPad was introduced as a learning tool in the various schools
- How the introduction of the iPad has been
- What applications and learning platforms are used
- How teachers, pupils, and parents are practicing regarding the iPad and applications.
- What the iPad is used for both at school and at home
- Rules and attitudes and digital competence.

The estimated time of about 30 minutes was set up for the interviews, but it naturally varies from informant to informant, how much they want to convey, and how many follow-up questions that are relevant to be asked.

3.3 Digital questionnaire

Based on the findings from the interviews and the research questions, a questionnaire was created. As apposed to interviews, a questionnaire, are a relevant method of gathering large amounts of user data (Østbye et al., 2013; Tomitschi et al., 2019). The questionnaire can also determine important subgroup differences, which is especially useful in the insight work to understand the different degrees of understanding when it comes to digital learning (Leedy and Ormrod, 2016). Using the questionnaire as a method, the data can in a clear way be categorized and compared, since respondents have answered the same questions. The disadvantage of this method is that people might not complete the questionnaire because it becomes too boring or they are interrupted and forget it. There is also a high probability that many do not bother to take the time to answer the survey at all. Therefore, the questions were chosen carefully. A set of selected relevant questions must therefore be created to fulfill the objective (Østbye et al., 2013; Tomitschi et al., 2019).

Advantages, however, are that the form can be efficiently adopted by others who aspire to improve their research through a better understanding of their users' attitudes and experiences (Baxter et al., 2015). At the same time, all respondents receive the same answer alternatives and are thus easily comparable (Østbye et al., 2013).

The questionnaire was pilot tested (Tomitschi et al., 2019) to make sure that the questions were understood the same way consistently by participants. First, it was tested on 3 people who were not in the target group, where the focus was on general understanding, wording, and sentence structure. Further it was tested on 3 people that were familiar with the theme, but not in the target group themselves, but parents with older children. These were tested to find out if the questions were perceived as relevant and well-designed.

Selection of questionnaire objectives

The main goal of the survey is to gain insight into the parents' perception of their roles in children's digital learning. Initially, it was desirable to reach out to parent groups at the school of the four informants. As all the informants work at schools in different municipalities and counties, it would be relevant to gain knowledge about the parents in the same schools, and also compare the teacher's perceptions with the parents' opinions. That turned out to be very challenging, as the school's management did not want this, as they were afraid it would harm the school in a way. Therefore, a different sampling strategy had to be implemented.

The nonprobability-based sampling strategy snowball sampling (Baxter et al., 2015) was then chosen as the sampling strategy. This means in practice that it starts by sharing the survey with some respondents, who further send the survey to acquaintances in the same target group, who then send it further again. The negative side of using this method is that the respondents tend to get self-consistent samples because people often know and suggest other potential participants who are similar to themselves. Another disadvantage of this method is that you can not calculate a response rate, as you do not have an overview of how many are actually assigned to the survey. The positive aspects, on the other hand, is that it is effective to get respondents and that they are eventually distributed over a larger geographical area and in different parent groups so that greater differences can be found. This method can also lead to possibly more people wanting to answer as the respondents are someone who knows someone, thus often increasing the probability that the respondents take the time to answer (Bedrekommune, n.d.).

The sample consisted of 51 parents to children in primary school. In total, 35,4% of the participants (n = 18) were men, while 64% of the participants (n = 33) were women. Participants´ are ranged between 28 and 62 years, with a mean of 38,5. All of the participants had access to internet at home, where 3,9% (n = 2) had tele line. **Table 1** reports the frequencies and percantages associated with the academic level of the parents. The most frecuently academic level was university education, and the least common category was elementary school.

Table 1. Frequencies and percentages of academic levels

Academic levels	Frequent	Percentage
University Education	31	60,9
Vocational learning	9	17,6
High School	7	13,7
Elementary School	4	7,8

Questionnaire guide

The respondents were asked a total of 15 questions divided into 3 parts (Appendix 4). Part 1 was about general background information, part 2 was about the parent's perception of digital tools for their children, and part 3 was about the parent's role in the usage of digital tools.

In the questionnaire, every question except the respondent's age is close-ended questions (Tomitschi et al., 2019). With closed questions, the respondent answers between different choices. 10 of the questions dealt with various statements about degree of agreement (strongly agree-strongly disagree) or frequency (never-every hour). The remaining questions were more personal questions where the participants used checkboxes of alternatives to respond to their answer on questions such as gender and academic level. Based on these questions it is possible to find patterns and compare background knowledge against attitude.

As mentioned, the questionnaire is inspired by a previous study with a similar theme from Hong Kong (Siu-Cheung Kong, 2018). Two questions concerning finances have been removed, as these are irrelevant as the the Norwegian public school is free. Additional questions have also been added to gain more insight primary into the issues concerning the iPad, internet access, digital competence, learning platform, and motivation.

Different common phenomena that are addressed in questionnaire surveys are in other research papers often divided into the different main groups of characteristics, behaviors, attitudes, knowledge, and perceptions. It is precisely such categorized questions that are asked in this questionnaire (Østbye et al., 2013).

The following topics are addressed in the questionnaire:

- Perception of children's learning
- Understanding of digital learning
- Perception of digital learning
- Support for digital learning
- Concerns for digital learning
- Motivation for digital learning
- Participation in the digital learning platform
- Usage of digital learning platform
- Introduction and training of the iPad as a learning tool.

An estimated time of about 10 minutes was set up, but this naturally varies from respondent to respondent.

3.4 Processing of data

Data analysis of interview

To be able to focus completely on the interview itself, listen actively, and to be able to ask good follow-up questions, audio recordings were taken of the interviews. In this way, it was certain that no useful information was not lost, and that distracting keyboard clicks and lack of eye contact took place.

It was also possible to concentrate on any visualizations and examples that were shown, and easier to remember what have been seen, when note-taking wasn´t necessary in the degree it would be if the interviews were not recorded. This was something all informants approved in the consent form. After the interviews were conducted, they were transcribed. The oral audio recording was transferred to a written interview and categorized under the various questions that were asked. Here, edited transcripts (Baxter et al., 2015) were written, where word crutches and misstatements were not important. As the interviews were written down, the audio recordings were immediately deleted. The transcribed interviews were stored separately from the signed consent forms.

Data analysis of questionnaire

When all the survey responses were collected it was time to find out what all the responses are meant. The survey was divided into units, with each unit representing one respondant. In the questionnaire, much information has been collected about each person based on the answers the people give to individual questions (Østbye et al., 2013). The first step is to get the data into an electronic file in the form of a spreadsheet that contains units, variables, and values, ie the data matrix (Østbye et al., 2013). The data matrix contains all the data used in the survey and provides a starting point for the entire analysis. The first thing to do then is to find abnormalities, such as if someone has written a completely improbable age, or merge if someone has written something on the ”other” alternative that is actually part of an already given alternative.

The questionnaire is analyzed in a univariate analysis, where each variable is analyzed. This is called a one-way analysis, where three conditions are looked at. The analysis in this thesis will look at how the units are distributed on one and one variable, where this is shown through a frequency advantage, which is further illustrated through a graphical representation. Furthermore, an expression is collected of what the averages are. Then it will be interesting to see if the units concentrate on a few values, or if there is a spread around many values. Here we will take a look at whether most of the respondents are fairly close to the average, or whether there is great variation. Here, a measure of dispersion is calculated.

The questionnaire provides data analysis for closed-ended questions, except for the age of the participants (Baxter et al., 2015), which was a question that needed to be manually filled in by numbers. When asking closed-ended questions it is more representative to compare and describe the statistics of the sample population. The essence of surveying is sampling, and through the data collection, the goal is to find patterns and connections.

When the digital questionnaire is being analyzed, it has been chosen to convert the Likert scale to dichotomized variables (DeCoster et al., 2009). This makes it easier to present the results of the analysis. The dichotomized variables in this analysis are by converting partly agrees and strongly agree to positive, and partly disagree and strongly disagree to negative. This is because positive and negative are variables that are often used in practice (DeCoster et al., 2009) rather than agree and disagree when it comes to the topic the thesis is about.

The reason why respondents were not asked about positive and negative attitudes in the first place is that these can be perceived as socially acceptable answers, which means that no matter what they had meant, they would try to give a sympathetic picture of themselves by giving political or morally correct answers (Østbye et al., 2013). This merger applies to several variables that have become: high/low motivation, high/low digital competence, not concerned/concerned, included/not included, and facilitates/do not facilitate. Neutral is still standing as an alternative, as the respondents should not be forced to have an opinion.

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Foresattes opp	Foresattes inte	Foresattes inte	Foresattes inte	Foresattes inte	Foresattes inter	Som foresatt er	Som foresatt e	Som foresatt e	Som foresatt er	Som foresatt e	Som foresatt er	Som foresatt er	Som foresatt er
2	Helt uenig	Nøytral	Nøytral	Nøytral	Nøytral	Nøytral	Helt uenig	Helt uenig	Delvis uenig	Helt uenig	Helt uenig	Helt uenig	Helt uenig	Helt uenig
3	Nøytral	Helt enig	Helt enig	Delvis enig	Delvis uenig	Delvis enig	Helt enig	Delvis enig	Nøytral	Nøytral	Delvis enig	Delvis enig	Delvis enig	Delvis enig
4	Delvis uenig	Helt enig	Helt enig	Helt enig	Delvis enig	Delvis enig	Helt enig	Delvis uenig	Delvis enig	Delvis enig	Delvis uenig	Delvis uenig	Delvis uenig	Delvis uenig
5	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Helt enig	Helt uenig	Delvis enig	Delvis enig	Delvis uenig	Delvis uenig	Delvis uenig	Delvis uenig
6	Helt enig	Helt enig	Helt enig	Helt enig	Delvis enig	Delvis uenig	Delvis uenig	Delvis enig	Delvis enig	Helt uenig	Helt enig	Helt enig	Helt enig	Helt enig
7	Helt enig	Helt enig	Delvis enig	Helt enig	Helt enig	Helt uenig	Delvis uenig	Delvis enig	Delvis enig	Nøytral	Delvis enig	Nøytral	Nøytral	Nøytral
8	Delvis enig	Delvis enig	Delvis enig	Nøytral	Helt enig	Delvis uenig	Helt enig	Delvis enig	Delvis uenig	Delvis enig	Delvis enig	Delvis uenig	Helt uenig	Delvis uenig
9	Helt uenig	Helt uenig	Helt uenig	Helt uenig	Helt uenig	Delvis uenig	Delvis uenig	Delvis enig	Delvis enig	Helt uenig	Delvis enig	Delvis enig	Delvis enig	Delvis enig
10	Delvis enig	Helt enig	Delvis enig	Helt enig	Helt enig	Delvis uenig	Delvis uenig	Helt uenig	Delvis uenig	Helt uenig	Nøytral	Helt uenig	Helt uenig	Delvis enig
11	Nøytral	Delvis enig	Nøytral	Delvis enig	Helt enig	Delvis uenig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Nøytral	Nøytral
12	Nøytral	Helt enig	Helt enig	Helt enig	Helt enig	Helt uenig	Helt uenig	Helt uenig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Helt uenig
13	Helt enig	Delvis enig	Helt enig	Helt enig	Delvis enig	Delvis uenig	Delvis enig	Nøytral	Nøytral	Delvis uenig	Delvis enig	Nøytral	Delvis uenig	Nøytral
14	Nøytral	Helt enig	Delvis enig	Delvis enig	Delvis uenig	Nøytral	Helt enig	Delvis enig	Helt enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Delvis enig
15	Helt enig	Helt enig	Delvis enig	Delvis enig	Delvis enig	Helt uenig	Delvis enig	Delvis uenig	Delvis uenig	Delvis uenig	Helt enig	Delvis enig	Nøytral	Delvis enig
16	Helt enig	Helt enig	Helt enig	Helt enig	Delvis enig	Helt uenig	Delvis enig	Delvis enig	Delvis enig	Nøytral	Delvis enig	Delvis enig	Delvis enig	Nøytral
17	Nøytral	Helt enig	Helt enig	Helt enig	Helt enig	Helt uenig	Nøytral	Delvis enig	Helt uenig	Delvis uenig	Nøytral	Helt uenig	Nøytral	Delvis enig
18	Helt uenig	Helt enig	Helt enig	Helt enig	Helt enig	Helt uenig	Delvis enig	Delvis uenig	Delvis enig	Delvis enig	Delvis enig	Delvis uenig	Delvis uenig	Helt uenig
19	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Nøytral	Delvis enig	Delvis enig	Helt enig	Delvis enig	Delvis enig	Helt enig	Delvis enig	Nøytral	Helt enig
20	Nøytral	Helt enig	Delvis enig	Delvis enig	Helt enig	Helt enig	Helt enig	Nøytral	Delvis enig	Nøytral	Nøytral	Delvis enig	Delvis enig	Nøytral
21	Helt enig	Delvis enig	Delvis uenig	Helt enig	Delvis enig	Delvis enig	Delvis uenig	Delvis uenig	Delvis enig	Helt uenig	Delvis enig	Nøytral	Helt uenig	Helt enig
22	Helt enig	Helt enig	Delvis enig	Helt enig	Delvis enig	Delvis uenig	Delvis enig	Helt enig	Delvis enig	Nøytral	Helt enig	Delvis enig	Nøytral	Delvis enig
23	Delvis enig	Delvis enig	Delvis enig	Delvis enig	Helt enig	Helt uenig	Nøytral	Delvis uenig	Nøytral	Delvis uenig	Delvis enig	Delvis enig	Nøytral	Delvis enig

Figure 4. Section of data matrix

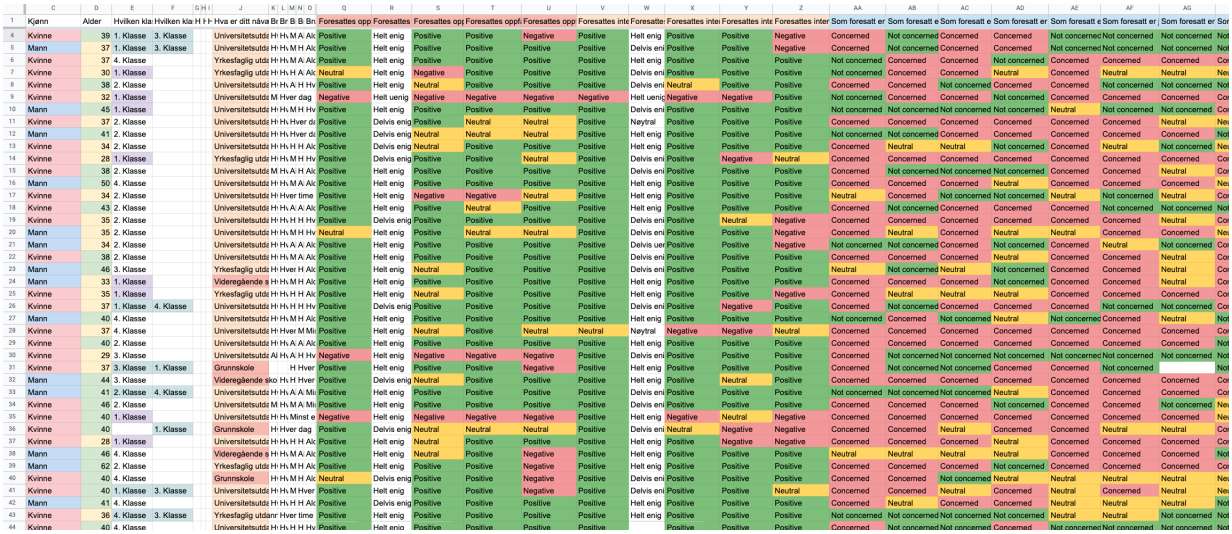


Figure 5. Finding patterns in data matrix

3.5 Research data into user needs

After analyzing the structured interviews, the main insights are transferred to post-it notes. The statements and answers were turned into shorter formulations and keywords. Each informant received their color on the post-it notes on a digital research board, Miro (www.miro.com). By using post-it notes, one can effectively organize, group, and gather insights, and in this case, compare the informants. The same procedure was performed for each informant. Findings from the survey were also turned into tables and graphical elements where the data was visualized. Here, the overall answers could be seen in a clear way, and variations were found.

In this phase, the findings are structured. After completing and collecting the planned data in the research, they must be analyzed. To be able to analyze, it is useful to get them structured. User research methods like interviews and questionnaires often lead to a large amount of data. This can make it difficult to gain insights just by looking through the data (Tomitschi et al., 2019). To solve this, the data was analysed trough affinity diagramming.

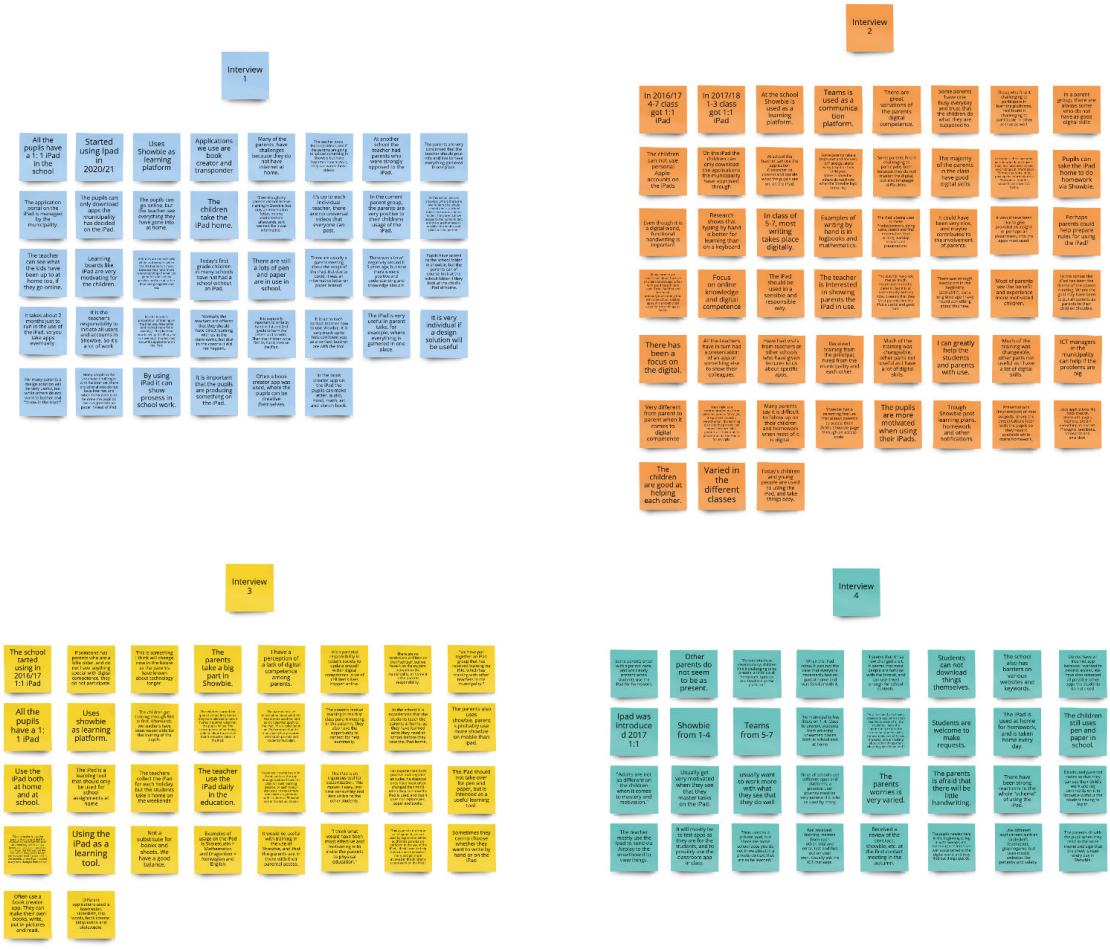


Figure 6. Division of informants on post-it-notes

Affinity diagram

To get an overview of all the user insight, an exercise called affinity diagramming is used. Affinity diagramming is an effective technique for processing such data (Baxter et al., 2015; Tomitschi et al., 2019). The affinity diagram technique was used to group the qualitative and quantitative data (Preece, Sharp, and Rogers, 2015). The post-it notes used to structure the data from each informant and the survey were collected and divided into different categories. By affinity diagramming similar findings can be grouped to identify themes in the raw data (Baxter et al., 2015).

Some of the information collected was not directly relevant to the thesis, but much of the information was necessary to know in order to understand the topic and understand the situation. The affinity diagram exercise was further used to build personas, which is presented in chapter 6 (Baxter et al., 2015).

Figure 7. Affinity diagram of interview insight

3.6 Research evaluation

It is important to look at the study with a critical eye. Here, validity and reliability are assessed, as well as strengths and weaknesses and what could have been done differently.

Validity

In this thesis, both qualitative and quantitative methods have been selected according to which approach suits the problem best, and both of them have their strengths and weaknesses. In this case, it is best to conduct a few in-depth qualitative interviews to gain a basic understanding, but a more general look from the quantitative questionnaire. The validity deals with the relevance of the data and the analysis according to the problem (Østbye et al., 2013). Both methods are created according to getting answers to the research questions that are based on the problem. In both the interviews and surveys, the terms from the theory are used for the collection of the insight. The teachers have been well acquainted with the various concepts that have been used in the theory, and it has not been necessary to word them differently, but in the questionnaire, additional examples or descriptions were placed in parentheses in the form of operationalization (Østbye et al., 2013).

Concerning the digital questionnaire, the aim was to obtain information about the respondents' characteristics, such as background information about gender, age, and education, as well as the respondent's behavior. These are usually answers that are objectively seen, and correct. Furthermore, the parents were asked several attitude questions. To measure the validity, one must look at whether the questionnaire questions manage to reveal the attitudes. The various attitude questions the respondents answered were asked with answer alternatives ranging from strongly disagree to strongly agree, as it can be difficult to get sensible answers to direct questions about the attitude. These questions are called question batteries (Østbye et al., 2013), and was analyzed separately and merged into indices.

On the other hand, it is more difficult with the attitude questions than the other question categories to determine whether the respondent answers correctly or not, as these are attitudes that only exist in the parents' heads. These types of questions are thus the most problematic questions when it comes to saying whether they are valid or not. The important step that was taken in the attitude questions was then to separate neutral as a legitimate alternative so that the respondents were not pressured to have an attitude they do not have so that the answers would be as valid as possible. In the questionnaire, closed-ended questions were asked with the likert-scale as answer alternatives, where the formulation of the questions was well thought out and prepared mainly from a previous study (Siu-Cheung Kong, 2018). By asking the closed questions, there is of course always a danger of missing important answer alternatives, but since these were claims of agreement and disagreement, the respondents were given their opinion, or the choice to be neutral.

Reliability

It is also important to look at the reliability of the research, and the quality of the collection and processing of the data. Reliability is about the degree to which an assessment strategy gives consistently similar results when the entity being assessed has not changed (Leedy and Ormrod, 2016). It is often challenging to have both high reliability and validity in the same information retrieval (Østbye et al., 2013).

The quantitative survey has its strengths when it comes to maintaining high reliability, while the qualitative interview scores high on the use of the relevant theoretical concepts, ie high definitional validity (Østbye et al., 2013). The data collection, processing, and analysis of the questionnaire were carried out in a solid manner that led to interpretation problems and other errors. The errors that occurred were easy to find in the pattern, an example is that one respondent had written their education on the ”other” option instead of clicking on the right alternative of the level of education. Another had written the number of their age with ”years” next to it, which caused it to fall outside the category of the year.

The interviews provided opportunities for follow-up questions that provided a nuanced picture of what the interviewees meant. On the other hand, there could be a greater probability that the informant felt pressured to answer something the interviewer wanted (Østbye et al., 2013). This was something that was tried to be avoided by me as a researcher staying completely neutral and informed that I only needed information on the topic, but I had no angle on it and asked neutral questions.

Bias

Like many of today’s surveys (Leedy and Ormrod, 2016), the survey in this study was also conducted digitally, where ampling bias can occur. As some of the questions are about digital competence, the fact that the survey is conducted digitally may say that the user group with very little digital competence is absent.

The topic for the master’s thesis can engage parents who have strong opinions from before and think it is an important topic, these will then most likely respond to the survey. Those who, on the other hand, are not as committed to the topic or see the importance will probably not answer. When it comes to the interviews, this also became clear, as the teachers who were willing to be interviewed knew a lot about the iPad compared to the other teachers in the schools.

Regarding the survey, it may as well also be the case that those parents who are not motivated to participate in the learning platform or in general in the child's use of the iPad as a digital learning tool, may not be motivated to participate in a survey on the topic either. It can also be discussed whether interviews with parents should have been conducted rather than a survey to get more in-depth and have the opportunity to ask follow-up questions. After taking a few rounds on this, it was concluded that this can be a sensitive topic for many, and in personal interviews, it can be embellished on the truth, and that one may not want to state how little involved and motivated one is, rather than in a survey where you sit anonymously behind a screen and perhaps dare to be honest with yourself when you can think carefully before answering.

Sample and population

A population is a whole group one wants to draw a conclusion about (Leedy and Ormrod, 2016). Difficulties that have arisen in the project have first and foremost to getting hold of interview subjects who wanted to participate. There have been many rounds of e-mails to several schools in many different municipalities. Many potential informants first say yes, and then cancel, which has been very time-consuming. From the schools 'side, the reason for the rejection has been due to the corona pandemic, which has been very demanding for the schools' activities, as for many others. Which may indicate that it is extra hard to fint participants to research project during a world wide crisis.

In the survey parents with children in the primary school are the population, while in the interviews there are teachers in the primary school population. In the survey, the representative sample for the population is a good variation from various variables such as gender, age, and education.

Since the snowball method was used in the survey, the researcher can also not be 100% sure that the representatives are the true user population since it is not controlled who receives the survey or not, and one can never know about those who respond the survey are honest in their answers or not. Here one must trust that those who responded and who have not been in the target group had understood this as they did not have children to tick in the answer alternatives, but this can never be completely certain. When it comes to the interviews of the teachers, it is certain that these are functioning teachers in primary school, as the contact went through principals.

In the questionnaire, it is the questionnaire itself that is the measuring instrument. Almost regardless of which method is used in research, there is a discrepancy between reality and what is analyzed. (Østbye et al., 2013) Through the methods, only a few parents respond at the expense of all parents with children in primary school, and only 4 teachers respond at the expense of all teachers in primary school in Norway.

3.7 Ethical considerations

When conducting research using participants, several ethical considerations must be taken into account. Research ethics are moral norms for scientific practice, and when conducing studies involving people, these ethical issues must be addressed (Østbye et al., 2013). These ethical principles are conducted to protect the rights of the research participants and maintain scientific integrity and enhance research validity (Bhandari, 2021).

When conducting research, one is dependent on being able to have participants to build the research on. The quality of a researcher's work depends on how willing people are to share their time and energy. The access the researchers get is a privilege that is built on trust from the participants. It is therefore necessary to have good knowledge, as well as inform participants about ethical considerations that are taken, and how information and insight are treated (IDEO, 2015). It is also the researcher's responsibility to protect the participant's physical and psychological well-being (Baxter et al., 2015).

It is important that participants understand what it means to participate, and comprehend and agree to any risks. They should also understand how their personal data will be protected and get a chance to ask questions. They should also be able to withdraw without penalty at any point in time. These are important points that the researcher must ensure that the participants understand and receive information about, which this master's thesis is informed about via a consent form (Baxter et al., 2015).

In the informed consent form (Appendix 1 and 3) important points in ethical considerations are presented for the participants (Østbye et al., 2013; IDEO, 2015; Bhandari, 2021). The participants were informed about the purpose of the project, who is responsible for the research project, why the participants were asked to participate, what it means to participate, that it is voluntary participation, their privacy, what happens to the information they give when the project ends, their rights, the researcher contact information, and a declaration consent, where they sign that they still want to participate and that they have understood the previous information.

Two different consent forms have been created in this project. This is due to the use of two different methods, where one consent form associated with interviews (Appendix 1) is informed in more detail due to the information coming directly from the informant, where I as an interviewer receive directly sensitive information such as name, job title, and workplace. The questionnaire (Appendix 3), on the other hand, is under different circumstances, where the researcher not directly in contact with the respondents. Here, there is thus no need for a written signature, but rather a check box where they agree to participate in the study.

This thesis follows NTNU's guidelines for privacy and guidelines from NSD for registration of projects (NSD, "Fylle Ut Meldeskjema for Personopplysninger"). In the thesis, it has been chosen to gain insight from employees at the primary school, and parents of children at the primary school to answer the research questions. Since attitudes and perceptions about children's activity with digital tools are discussed, children are considered a third party in this research project. It can be seen as a weakness that the children themselves have not had an expression in this thesis, but the thesis believes that since it is the parents who are the target group, and only their attitudes around the topic that concern the children, it is not relevant to get voices from the children themselves. When teachers are interviewed, arrangements are made so that the data collected does not in any way identify individual pupils or reveal confidential information (NSD, "Barnehage- Og Skoleforskning"). The duty of confidentiality is something the teacher is reminded of before the interview, and both I as a researcher and the teacher have a joint responsibility in this area so that this is maintained.

It is stated that this assignment initially has no client, and is thus unaffected by the desire for a final conclusion. Lack of experience in interpreting analysis results can affect the final result and the thesis recommendation further.

Results

4. Results

In this chapter, general findings from the used methods used are presented. The findings from the qualitative interviews are described by topic, while the findings from the quantitative questionnaire are presented trough diagrams and tables. This chapter provides an overview of the findings, whereas an analysis of findings against the research questions is first presented in Chapter 5.

4.1 Interview findings

Here, the findings are presented by reviewing what the informants stated and informed about the various topics in the interviews.

Learning platforms and applications

The first result is about the general use of the learning platform and applications used on the iPad in school. Different platforms that are used based on the informants are Vigilo, Teams, and Showbie.

An informant describes that via Vigilo, parents receive a weekly email from the teacher with information. The pupil's learning plan is also posted on this platform and parents can report their children's lack of appearance. It is informed that most parents uses their smartphone to use Vigilo. Other informants use Showbie as a learning platform, which consists of two folders. Of these, one is a school folder, and the other a home folder. The parents have access to the home folder, and the pupils have access to the school folder. The teacher has access to both.

There are also mentioned several different applications that are used on the iPads at school. There are different applications for different subjects and different purposes. An application that has been mentioned by all informants is the Book Creator app. Through this application, pupils can create a process book of their work. Different books that the pupils make on this application are letter books, audiobooks, math books, art books, and sketchbooks. Other activities that can be performed on this application are mind maps, reading, inserting pictures, and writing.

Usage of the iPad in the school context

The second result is related to one of the main topics in the interviews, which was what the iPad is used for in a school context. It was stated in the interviews that the school of several of the informants used the iPad as a learning tool already in the school year 2016/17, while others in 2020. As there are several users of the iPad in this context, both teachers, pupils, and parents, it was useful to find out how the different groups used the tool.

First, it is highlighted how teachers use the iPad in a school context. The informants who were interviewed described that they as teachers use the iPad to a large extent for communication. Through the iPad, teachers communicate with pupils, parents, and colleagues. It is also described that via learning platforms, teachers publish learning plans, homework, share assignments and give out other important notifications. It is understood that it is up to each contact teacher how they want to use the iPad, based on their knowledge, relevance, and the perceived usefulness of the iPad.

Among the findings, there is a voice that says that the iPad is very useful when it comes to parent/teacher meetings, where all the information about each pupil is gathered in one place, rather than distributed on many different sheets. Another voice believes that the iPad is an ingenious tool for customization. All informants use the iPad daily and connect the iPad via airplay to smartboards where relevant information such as presentations or other desired material can easily be visually communicated from the teacher to the pupils.

Furthermore, insights were gathered from the informants about how the pupils use the iPad in a school context. Findings from the interviews indicate that the pupils use the iPad to a large extent to produce their work. The iPad is also used to complete tasks, search for information and present your own work. One informant also believed that his pupils had the opportunity to make wishes about when the iPad should be used at school.

When it comes to parents, there is no requirement that they have to use the iPad at home. The main focus on parents is how they participate in digital learning, whether it is through the smartphone, computer, or an iPad. Findings from the interviews show that it is very different from parent to parent how involved they are in the use of the iPad. It is through the various platforms the schools use the parents participate through the previously mentioned parent access folders. Homework, weekly plans, and info for the parents are published there. It is also mentioned from several informants that via the learning platform Showbie, there is a parenting feature, which allows parents to access their child's page, where they can see their children's work through an access code. Findings from the interviews indicate that some parents participate by sitting with the children who use the iPad to read and complete tasks.

Positive voices from informants concerning the iPad as a digital learning tool stated that they as teachers can see how the iPads as a learning tool motivate the children in learning. There should be a focus on online knowledge and digital competence. Several of the informants mentioned that they are interested in showing the parents how the iPad is used and that in learning the iPad should be used sensitively and responsibly.

Training of the use of the iPad as a learning tool

Further results are related to the training of the use of the iPad as a digital learning tool. Here aswell, there are differences between the teacher, the pupils, and the parents. According to the informants, there have also been differences in how this has been carried out from school to school.

Two informants had training through an external company, where this training was perceived as very useful. Then courses have been arranged, consisting of evenings that provided learning on how to set up the iPad. The remaining informants have received training from the principal and those who work with ICT at the school, of which it is the ICT manager at the school who should be contacted if problems or uncertainties arise regarding the iPad. Findings from the interviews also say that there is a lot of trial and error and that the teaching staff must ask and learn from each other. After any training, it is the teachers who are responsible for the training of the pupils.

When it comes to pupil´s training of the iPad as a learning tool, it is differences both from school to school, but also from class to class. Informants describe that the pupils are good at helping each other, and that ”the road is created while you walk” through trial and failure. It takes about 2 months just to get all the pupils’ iPads up and running, and pupils often need help at the beginning to learn login and other technical aspects they do not have experience with before. It is emphasized in the interviews that today’s young pupils are often used to using the iPad at home, and thus absorb the information more easily than many adults can do, which is in line with previous research on the topic (Jernes, Alvestad, and Sinnerud, 2010). Each school has its own rules that pupils must follow. One consequence that is mentioned is that the pupil can be deprived of the iPad from the teacher for a certain period in case of violation.

Even if the parents themselves are not given an iPad, it is relevant that they receive training in how to use the iPad, so that they can assist their children at home. Findings from the interviews indicate that here, too, there are large variations. One informant had an informal meeting with the parents where the goal was for the parents to get a user connected to their child on the learning platform. Some informants describe that the parents receive information about what the iPad is to be used for, and the rules that apply to the iPad. This is collected in an iPad contract that the municipality has prepared, which both parents and pupils must sign. It is also explained that there is usually a parent meeting about using the iPad. However, due to the corona pandemic, it was an informative letter instead of on paper. Findings from the interviews also indicate that the pupils teach the parents at home, as they have learned what they need at school before they take the iPad home.

Limitations on the iPad and home use

Findings from the interviews show that there are several different limitations of the iPad. This is for security reasons. In all of the interviews, it was explained that the pupils themselves can not download which applications they want from the app store that you usually can on an iPad. The app portal is managed by the municipality. It is thus the various municipalities that have decided which applications can be downloaded or not. In addition to this, teachers can also see what pupils are doing on the iPad via an application (classroom app), and teachers can also see what pupils have done on the iPad at home. The pupils can not do as they please on the internet, where there is restricted access. Pupils can take their iPads home every day to do homework, and use them as a learning tool both at home and at school. In some schools, the iPad is collected from the school before long holidays.

Digital competence among parents

One result that is important to mention is insights from informants related to digital competence among parents. Among the findings from the interviews, most parents have good digital skills, but in a parent group, there are usually always some who do not have good digital skills. Informants also point out that parents generally take a large part in the learning platform, but that some find it challenging to participate. Both because they do not have the digital skills needed, but also language difficulties. It is divergent how the parents behave on the learning platforms. Some parents take a large part in the learning platform and want to receive notifications every time something is posted on the learning platform, while others do not even know what the logo of the learning platform application looks like.

Voices from informants express that it is especially noticeable in children who have slightly older parents, that many often do not have the digital competence needed and that they then do not participate due to lack of competence. Interview findings point out that although there may now be a lack of digital competence among parents, this is something that will change as future parents have lived longer in the digital world. On the other hand, technology is always evolving, and one must always keep up with the times.

Findings from the interviews indicate that those parents who have many children often find it challenging to be present and follow up on homework, updates, and feedback on various platforms. Some informants also say that the parents who find it challenging to take part in the learning platform may also have found it challenging to participate in other areas, not just digital. It is also said that in the busy everyday life many have, there is a bond of trust between the parents and the child and that they trust that the children do what they are supposed to do from school work at home.

Some informants say that there are some problems in the districts because they do not have internet access at home. There are also situations where the parents do not have e-mail. This has then been solved by printing out information on paper and delivering it to the parents, or the children having to show it at home on their learning platform page. Informants express that it is a parental responsibility in today's society to update oneself within digital competence. A lot of children's lives happen online, and for parents to be able to raise their children in a digital world, they must keep up with the times.

Some informants say that when no training was used on the use of the learning platform, an information letter was sent out. It is claimed that none of the parents contacted the teacher afterward with questions, so either the letter was informative, the parents have a good understanding and high digital competence, or simply did not care enough to contact the teacher.

Parental attitudes among the iPad at school

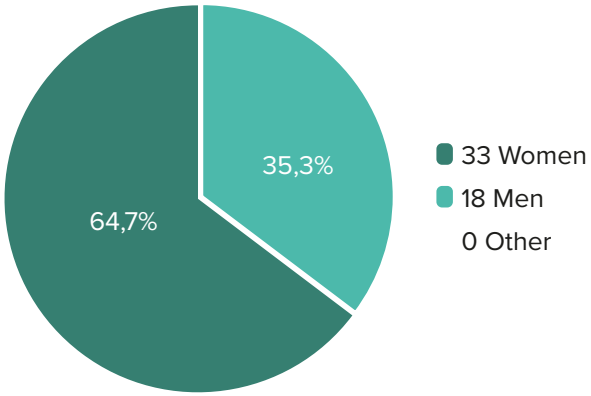
Similar to what the discussions in the media suggest, there was most skepticism about the use of the iPad in primary school in the beginning (2016/2017). When the iPad was first introduced, it was not always the case that the parents had used an iPad at home before or were familiar with the tool. The perception is that this has now changed. Most people are now familiar with the use of the iPad and can use it in school with their children.

There are and have been very varied attitudes around the use of the iPad in school, both positive and negative. Many parents have been worried that there would be little writing by hand, but it has been stated in the interviews that the iPad's intention has not been to take over for pen and paper but to be an extra tool. All informants state that several of those who have been skeptical have changed their minds when they have witnessed how the iPad has been used, that it does not replace physical textbooks, or that they only have one iPad in their lap all day. Nowadays, many parents see the benefits of the iPad. There are different attitudes now than there were 5 years ago. At that time, there was a lot of negativity around the implementation of the iPad, but now there is more positivity and understanding around its use.

4.2 Questionnaire findings

Part 1. General information about respondents

Diagram 1. The parents gender



Parents were surveyed to understand their perceptions of their roles and understanding of their children's digital learning. **Diagram 1** shows how many respondents from each gender participated. There were a total of 33 women, corresponding to 64,7%, and 18 men, corresponding to 35,3%. That is, there were as many as 15 more women than men who participated.

Diagram 2. The parents academic level

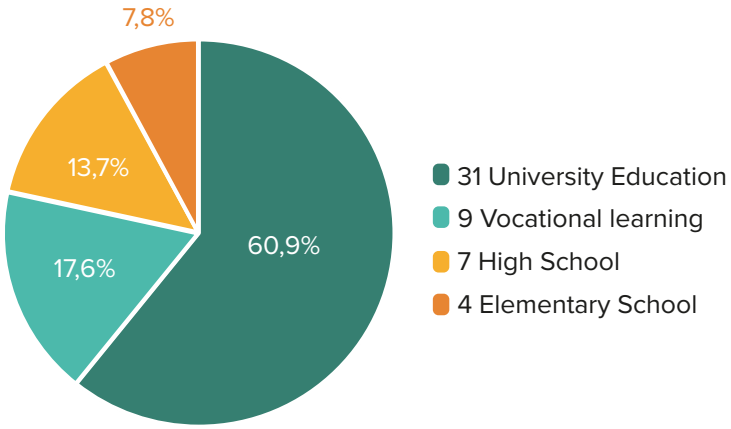
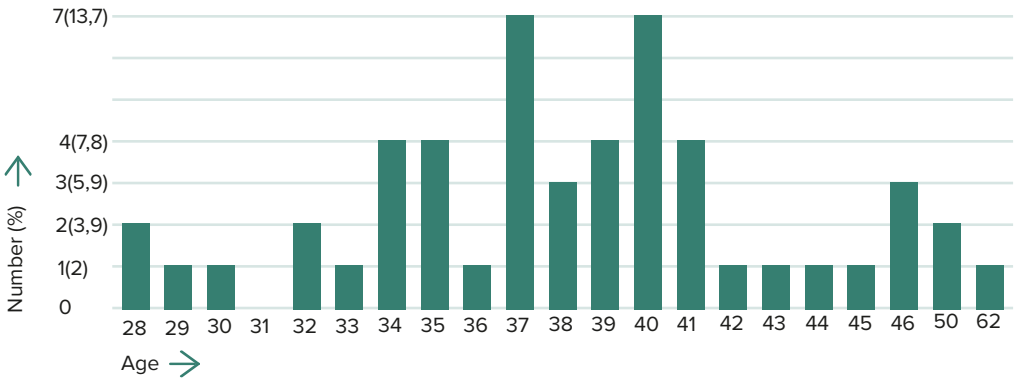


Diagram 2 illustrates the parents' academic level. This was to be able to draw comparisons around digital competence and academic level. Here, the majority of 60,9% had a university education, while 7,8% had elementary school as their academic level.

Diagram 3. The parents age



Mean	38,5
Median	38
Range	34
Minimum	28
Maximum	62
Count Number	51

Diagram 3 shows the age of the parents. All 51 parents filled in their ages. Here, there is a spread in age from 28 to 62 years, which means a range of 34. There were most 37-year-olds and 40-year-olds who participated in the survey.

Digram 4. The grade the child/children attend

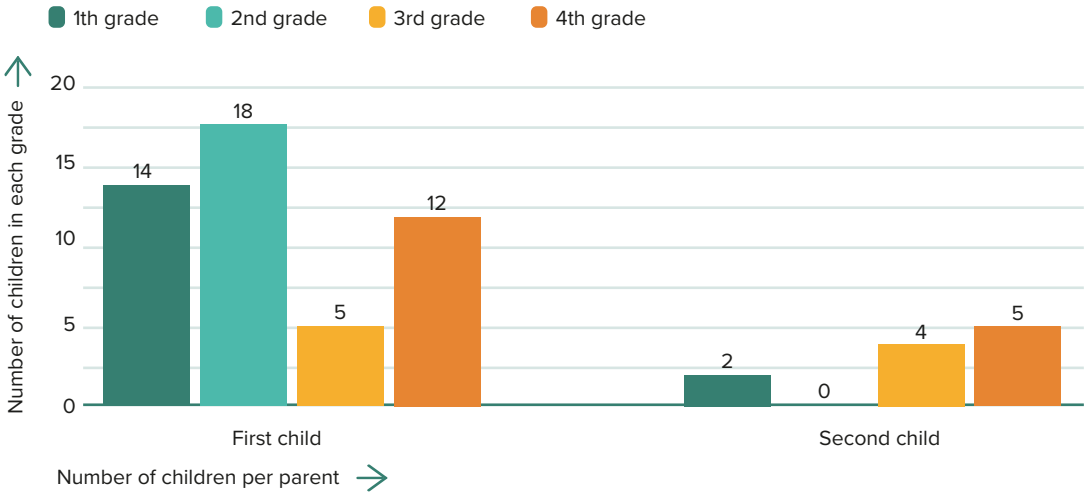
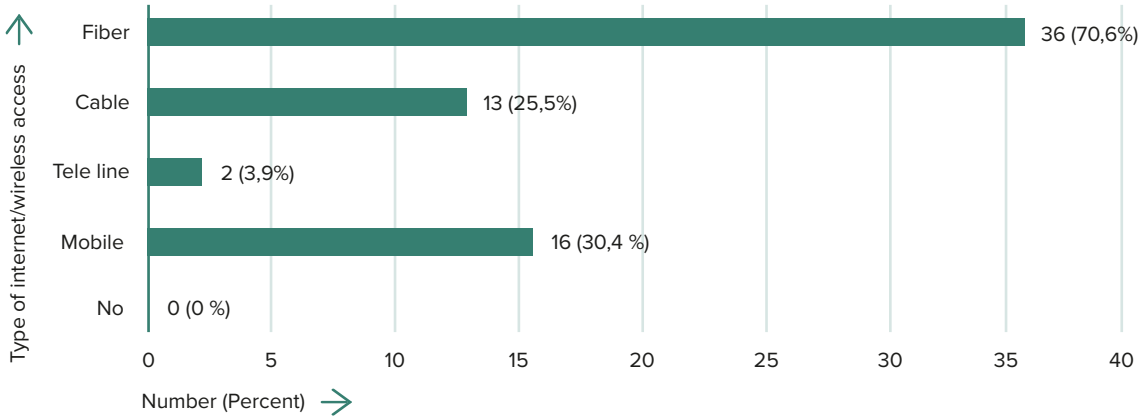


Diagram 4 gives an overview of which grade in the age group the parents' children are in, and whether they may have more children within that group. The parents were not given the opportunity to enter the age of children outside the age group, but could fill in whether the children in the target group were their first, second, etc. child in the row. The vast majority (*n* = 49) of the parents answered that their first child is in the age group, while 11 parents also have their second child in the age group. This means that out of a total of 51 parents, there are 60 children. When only the children's grade level is taken into account, the average grade level of the children is 2,45.

Diagram 5. Parents' internet and wireless access at home



The parents were also asked about what kind of internet access they had at home. This was useful to find out because this could be a factor when it comes to digital technology that needs access to the internet. **Diagram 5** presents that everyone who surveyed had internet access at home, which makes sence since the survey was contributed online. On the other hand, 67 responses have been received, which means that more people have access to several types of networks at home. The vast majority of 70,6% have access to fiber networks at home.

Table 2. Parents proportion of use of technologies in daily routine

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Never(1)	Once a month(2)	Once a week(3)	Every day(4)	Every hour(5)
PC	4,02	0,69	48	1(2,0)	0(0)	5(10,4)	33(68,7)	9(18,7)
Smartphone	4,48	0,49	49	0(0)	0(0)	0(0)	25(51)	24(48,9)
iPad/Tablet	2,95	1,12	44	9(20,4)	2(4,54)	15(34,0)	18(40,9)	0(0)
Smartwatch	3,04	1,62	41	15(36,5)	0(0)	2(4,87)	16(39,0)	8(19,5)
Smart houce device	2,02	1,34	37	23(62,1)	0(0)	4(10,8)	10(27,0)	0(0)

Table 2 shows the parents proportion of use of technologies in daily routine. Here, the 5-point likert scale of frequence (from 1 = never to 5 = every hour) was calculated to find mean and standard deviation (SD). The result says that it is overall the most frequent use of the smartphone, and then the PC. Few of the parents use iPad/tablet and smart house device frequently.

Part 2. Parents perception of digital tools for their children

Table 3. Parents' perception of children's learning

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
It is important for my child's future to use digital learning tools such as the iPad.	4,15	1,05	51	2(3,9)	3(5,8)	4(7,8)	18(35,2)	24(47)
My child can easily learn new digital tools like iPad.	4,52	0,91	51	2(3,9)	1(1,9)	0(0)	13(25,4)	35(68,6)
I encourage my child to learn new things via iPad.	3,66	1,06	51	2(3,9)	5(9,8)	13(25,4)	19(37,2)	12(23,5)
My child seems more motivated to learn via iPad as a learning tool.	3,88	1,21	51	4(7,8)	3(5,8)	8(15,6)	16(31,3)	20(39,2)
I think my child prefers digital learning as an iPad rather than learning without digital tools.	3,88	1,19	51	4(7,8)	2(3,9)	10(19,6)	15(29,4)	19(37,2)

Parents were also asked to rate agreement and disagreement on a scale from strongly disagreement to strongly agreement. **Table 3** shows the parents perception of childrens learning. On the various claims, there is a general agreement, where most people most agree that their children can easily learn new digital tools such as the iPad where the mean is 4,52. Although the majority more than agree with the statements, the point is about encouraging their children to learn new things that have a mean of 3,66.

Table 4. Parents' interest and commitment to digital learning

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
I'm interested in what my child does of digital learning on the iPad.	4,5	0,75	50	1(2)	0(0)	2(4)	17(34)	30(60)
I know how to use the iPad for digital learning.	4,28	0,84	50	1(2)	1(2)	4(8)	21(42)	23(46)
I support and get involved when my child uses the iPad as a digital learning tool at home.	4,38	0,84	50	1(2)	1(2)	3(6)	18(36)	27(54)
I think it is safe for my child to use the iPad as a learning tool both at home and at school.	4,04	1,05	50	1(2)	6(12)	3(6)	20(40)	20(40)
I am skeptical of digital learning and the use of digital learning tools at school.	2,41	1,22	51	14(28)	18(36)	5(10)	12(24)	2(4)

Another topic the parents were asked about was statements about their interest and commitment to digital learning, this is presented in **Table 4.** When it comes to the parents' interest in what the children do with digital learning on the iPad. Only one respondent strongly disagrees, while as many as 30 parents strongly agree. This gives a mean of 4,5. It is also presented that most parents both know how to use the iPad in digital learning and that they support and are involved in the children's digital learning on the iPad at home. On the other hand, there was on average a strong and partly disagreement when it comes to being skeptical of digital learning and the use of digital learning tools in schools.

Table 5. Parents' concerns about children's use of iPad as a learning tool

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
Poorer handwriting	3,62	1,37	51	6(11,7)	7(13,7)	4(7,8)	17(33,3)	17(33,3)
Dependence on technology	3,39	1,31	51	6(11,7)	9(17,6)	6(11,7)	19(37,2)	11(21,5)
Poorer sleep	3,43	1,10	51	2(3,9)	11(21,5)	9(17,6)	21(41,1)	8(54,9)
Poorer vision	3,16	1,20	50	6(11,7)	9(17,6)	12(23,5)	17(33,3)	6(11,7)
Exposed to inappropriate content	3,7	1,11	50	2(3,9)	7(13,7)	8(15,6)	20(39,2)	13(25,4)
Access to inaccurate information	3,45	1,14	51	3(5,8)	10(19,6)	7(13,7)	23(45)	8(15,6)
Easier to plagiarize greater likelihood of cheating	3,22	1,20	50	5(9,8)	9(17,6)	14(27,4)	14(27,4)	8(15,6)
Greater differences between children due to a possible lack of a digital learning environment at home	3,21	1,25	51	7(13,7)	8(15,6)	10(19,6)	19(37,2)	7(13,7)

Furthermore, the parents were given the opportunity to answer what kind of worries they had when it came to what the use of the iPad and other digital tools could lead to. **Table 5** illustrates the degree of concern per statement. What most parents agree that they are worried about is that their children will get poorer handwriting as an expense of the iPad and other digital tools. Furthermore, some parents are also concerned that the tools will lead to poorer sleep or give access to inaccurate information. When it comes to these statements, there is generally a widespread in what concerns the parents have, while many are also neutral in many of the statements.

Part 3. Parents role in the usage of digital tools

Table 6. Parents' adaptation to a digital learning environment at home

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
Acquire hardware such as a computer and tablet.	4,03	1,06	51	2(3,9)	3(5,8)	7(13,7)	18(35,2)	21(41,1)
Have a printer available.	3,33	1,45	51	9(17,6)	5(9,8)	13(25,4)	8(15,6)	16(31,3)
Assist with a sensible choice of online sources.	4,45	0,77	51	0(0)	2(3,9)	3(5,8)	16(31,3)	30(58,8)
Strategic time limit on iPad.	4,05	1,12	51	1(1,9)	5(9,8)	10(19,6)	9(17,6)	26(50,9)
Strategic placement of iPad.	4	1,29	51	3(5,8)	7(13,7)	4(7,8)	10(19,6)	27(52,9)

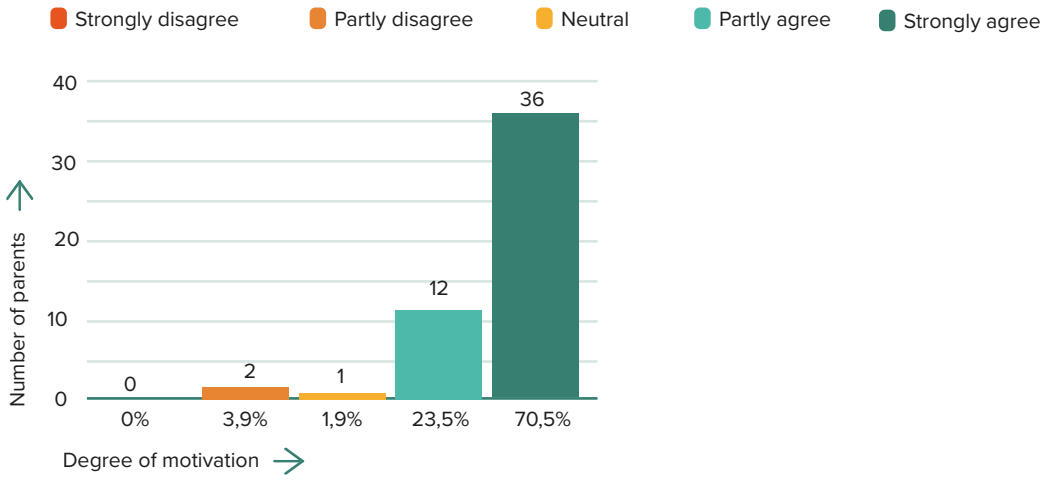
In table 6, the questions have shifted to the role and understanding of the parents. Here, the parents ranked agreement or disagreement in statements about their facilitation of creating a digital learning environment at home. Here, too, there is general agreement on the statements, but one result is that the least parents can do is have printing options at home. The statement most parents agree with is that they help their children choose reliable sources.

Further in **table 7**, the parents' understanding of digital learning is presented. Here there are evenly over partly or strongly agreements according to the mean which is well over 4 on all claims except one. The claim that digital tools are more practical and effective than traditional books and other printed material creates a little more disagreement where 1,9% strongly disagree and 21,5% partly disagree. Nevertheless, the majority (28%) somewhat or strongly agree, while 21,5% of the parents have chosen to remain neutral to the statement.

Table 7. Parents' understanding of digital learning

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
I can use digital devices such as desktops and tablets to gather information or complete tasks.	4,72	0,59	51	0(0)	0(0)	4(7,8)	6(11,7)	41(80,3)
I can use online resources to search for information.	4,80	0,44	51	0(0)	0(0)	1(1,9)	8(15,6)	42(82,3)
I have the digital skills needed to help and support my child with schoolwork on digital tools like the iPad.	4,64	0,59	50	0(0)	0(0)	3(5,8)	12(23,5)	35(68,6)
I have the impression that the parents in the parent group have different levels of digital competence (low to high).	4,11	0,89	51	0(0)	2(3,9)	12(23,5)	15(29,4)	22(43,1)
I believe that digital tools are a more practical and effective alternative to traditional textbooks and other printed materials such as dictionaries.	3,47	1,07	51	1(1,9)	11(21,5)	11(21,5)	19(37,2)	9(17,6)
I can communicate via digital devices such as computers or smartphones for discussions or information sharing.	4,76	0,64	51	0(0)	2(3,9)	0(0)	6(11,7)	43(84,3)

Diagram 6. Parents' motivation to digital learning



The parents' motivation is shown in **diagram 6**. Here, the parents were asked if they are motivated to take part in the children's learning on current digital platforms. The diagram shows on the y axis the number of parents and on the x-axis the degree of motivation. 0 parents strongly disagree that they are motivated, while 3 parents have answered that they partly disagree or are neutral. As many as 48 parents (94%) have ticked that they partially or strongly agree that they are motivated to digital learning on the platforms.

Diagram 7. Parents' use of digital learning platform

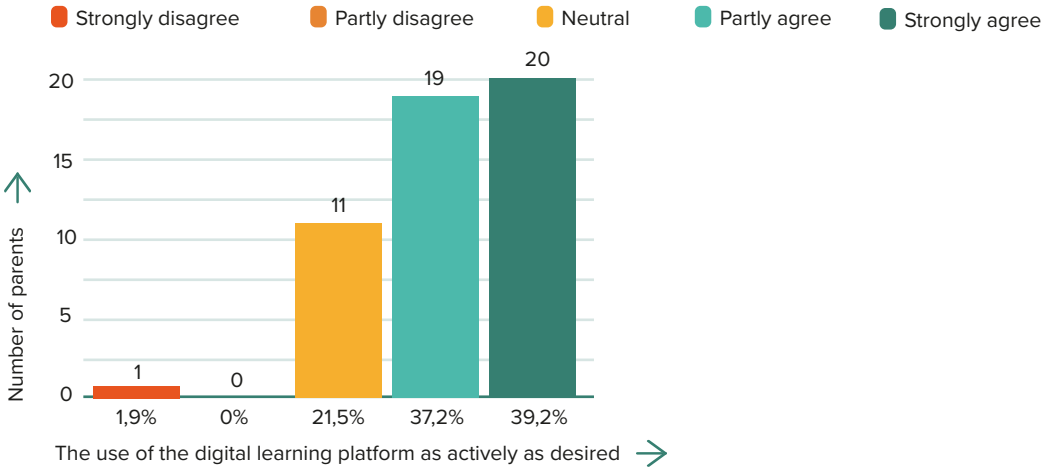


Diagram 7 illustrates the parents' use of the digital learning platform. Here, parents were asked if they participate in the digital learning platform as actively as they would like. The mean of the answers in this diagram is 4,11, which means that most parents agree to a certain extent that they are as active as they want to be.

Table 8. Parents proportion of use of technologies in daily routine

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Never(1)	Every month(2)	Every week(3)	Every day(4)	Every hour(5)
How often do you check if updates/information have been posted on the digital learning platform that applies to your child?	3,41	0,71	51	2(3,9)	0(0)	25(49,0)	23(45)	1(1,9)
How often do you read the information on the digital learning platform that applies to your child?	3,50	0,75	51	2(3,9)	1(1,9)	18(35,2)	29(56,8)	1(1,9)
How often are you active on the digital learning platform that applies to your child?	3,47	0,77	51	2(3,9)	2(3,9)	18(35,2)	28(54,9)	1(1,9)

Regarding parents' proportion of use of technologies in daily routine, this was, like Table 1, measured in frequency. **Table 8** provides an overview of how often parents check, read, or are active on the digital learning platform that applies to their child/children. According to the meanings of the various statements, we can see that most people both check (3,41), read (3,50), and are active (3,47) somewhere between every week and every day.

Table 9. Parents' introduction to the iPad as a learning tool

				Number (%) of parents choosing the option				
	Mean (1-5)	SD	N	Strongly Disagree(1)	Partly Disagree(2)	Neutral(3)	Partly Agree(4)	Strongly Agree(5)
I have received a course in the use of the iPad as a learning board when it was introduced to my child.	2,09	1,44	51	28(54,9)	7(13,7)	5(9,8)	5(9,8)	6(11,7)
I know who I can contact if I have any questions regarding the iPad as a learning board in school.	3,66	1,33	51	5(9,8)	7(13,7)	6(11,7)	15(29,4)	18(35,2)
I feel included in the use of the iPad as a digital learning tool in school for my child.	3,68	1,22	51	4(7,8)	5(9,8)	10(19,6)	16(31,3)	16(31,3)

The last subject the parents were asked about in the survey is presented in **table 9**. Here, answers about the parents' introduction to the iPad as a learning tool for their child/children were interesting. In the claim to have received training in the use of the iPad as a learning board, 54.9% of the parents strongly disagree, and 13,7% partially disagree that they have received learning/training. 9,8% are neutral, while 21,5% of the parents somewhat or very much agree that they have received learning/training in the usage. The majority of parents, on the other hand, know who they can contact if they have questions about the iPad and that they feel included in the use of the iPad as a digital learning tool at school for the child/children.

Other notes from digital questionnaire

Before the parents ended the survey, all respondents were given the opportunity to leave an additional comment on the topic if they wished. There were three parents who took advantage of this, and left a comment. One comment says that there is concern that their children may not be able to write by hand in the future and have an uneducated imagination. Another comment says that the survey sheds light on an important topic. The latest comment claims that the questions were very interesting and that the different answer options made it easier to express their opinions. This is an important issue for parents with young children, as it is a new technology that makes everyday life for children in many ways easier, especially in the time of the corona pandemic.

4.3 Introductory discussion

The iPad has become a well-known digital tool for better or worse in Norwegian primary schools. It is important that parents know their role and the importance of their participation when it comes to their children's use of digital tools. At the same time, it is important that parents have the necessary digital skills to support their own children in digital learning, and that they are included by the school to understand what the iPad is used for, as well as an open dialogue about how they can support children at home. This is included in the answers to the research questions in order to draw connections between this analysis and the findings that have been made through the methods for finding answers regarding the domestication theory.

Discussion

5. Discussion

This chapter aims to analyze the results from the methods used against the previously presented theory to answer the 7 research questions.

5.1 Answer to the study´s research questions

Previously, the overall findings from the used methods have been presented. To answer the 7 research questions, the most important and relevant findings from both methods will now be analyzed so the questions will be answered in accordance with the findings that have been made. Here, synthesis is carried out to find patterns and connections. The insight from the methods will also be analyzed against the previously described theoretical background, and put into context with the 4 phases of the domestication theory. Since all the insights from the interviews and the questionnaire were presented in the results section, not all the answers will be presented in the discussion section, only the answers that are relevant to each research question will be discussed here.

RQ 1: What are the parents' concerns when it comes to the child's use of the iPad?

In the first research question, the goal was to find out whether the parents are as worried as they have been in Norwegian media, and if so, what their concerns are about their children's use of the iPad in a school context. The findings were mainly carried out through the questionnaire with the parents, but it was also asked as an interview question to the teachers. In the survey, a question reads as follows: *I am skeptical of digital learning and the use of digital learning tools at school.* The goal here was to find out if parents have an overall skepticism about digital learning in general.

Based on the findings, 5 of the parents are neutral, 14 parents are to some extent skeptical, and 32 parents are to some extent not skeptical. That is, 27,4% of parents are skeptical. Based on this, one can conclude that the majority are not skeptical, and can thus also assume that most parents are not worried either.

To go more detailed on what specific concerns the parents have, they were presented with a number of statements where they should rank their concerns. The likert scale is converted to dichotomized variables (DeCoster et al., 2009). This means that the remaining variables are not worried, neutral, and worried. Here it also chooses to divide the concern questions into 3 categories. Three of the questions were allegations about the children's physical consequences (poorer handwriting, sleep, and vision). When these categories are merged, it means a total of 30 parents who are worried about the children's physical consequences.

Based on this it can be stated that 58,8% of the parents are to some extent concerned about the children's physical consequences.

Four statements about the impact of technology (addiction, exposure to inappropriate content, access to incorrect information, easier to cheat/plagiarize). When these categories are merged, a total of 29 parents are concerned about the impact of technology on their children. 56,8% of parents are therefore to some extent concerned about the impact of technology.

The last question was if they are concerned that there should be greater differences between the children due to a possible lack of digital competence among the parents. A total of 26 parents are worried about this.

This means that 50,9% of the parents are to some extent concerned about differences between the children due to the parents' digital competence.

To measure the parents' overall concern, the three categories are merged, which means that 55,6% of the parents are concerned.

Based on these findings, this means that only 27,4% of parents are skeptical about digital learning and the use of digital learning tools at school, while as many as 55,6% of parents are concerned. This may indicate that parents initially did not think they were skeptical, but later in the survey when they were presented with specific allegations, they felt a concern anyway.

In another question in the questionnaire that went on safety, the parents were asked if they think it is safe for the child to use the iPad as a digital learning tool, where 78,5% (n = 40) think it is safe for the children.

Through the interviews with the four teachers, it was established that most people are familiar with the use of the iPad today and that most parents know how to use it in a learning context with their children. It was also presented in the interviews that there are both positive and negative attitudes around the topic, which also emerges in the survey. In the interviews, it was concluded that many parents have been concerned that there will be little writing by hand, which was also the majority of the parents in the survey. However, the teachers reasoned that the intention is not for the iPad to take over for pen and paper, but rather to be an extra tool. But even though the teachers explain this in the interviews, the parents are still clearly worried.

All informants also said that most of those who have been skeptical have changed their minds after seeing how the iPad has been used, and when they have realized that the children do not sit with the iPad in their hands all day.

At the same time, it is said that most parents now see the benefits of the iPad and that there is more positivity and understanding around its use nowadays. This means that the interviews and the survey to a certain extent do not show the same result. The survey shows that most parents are positive about the use of the iPad and see its usefulness as the informants say, but the majority of the parents are at the same time concerned of its negative sides.

Earlier in the background chapter, it was presented that those who perceive technology can be divided into those who accept it, and those who reject it (Rama Murthy and Mani, 2013; Straker et al., 2018). After looking at the insight, it can be argued that this may not be as black and white as presented here. Because even though the parents see the positive sides of the iPad, and support and take part in its use, the majority are still worried. This may indicate that the positive aspects and use of the iPad are the greatest focus on the schools, but that the negative aspects should also be included, and that the various schools explain to the parents what they do to prevent the negative aspects as little as possible, rather than talking up all the positives they do with the iPad. It may also be that this is something the school focuses on as well, but that this has not had the necessary effect in that the parents are still worried, or that the teachers are not actually aware of the parents' concerns. Another previously presented theory, on the other hand, states that parents are generally concerned with the risks and expectations that follow along with the use of digital technology (Sandberg et.al., 2021), which is also represented in this survey.

An interesting observation is that 55,6% of parents are concerned, but 78,5% still think it is safe for the child to use the iPad as a digital learning tool. It should also be mentioned that it is often pervasive in the sense that those who are concerned about one thing are concerned about many factors.

The research question can thus be answered based on the insight that parents are still concerned, and they are concerned about several different factors, both physical consequences, the differences between the children due to the parents' digital competence, and the negative impact the technology has on their children.

RQ 2: What are parents' perceptions of digital learning?

The next research question is answered through the digital survey. This research question is based on parents' perceptions of digital learning. Here, the likert scale was converted to positive, neutral and negative variables. The parents made several different claims about their conception of their children's digital learning. Two of the questions are about the parents' own opinions regarding the children with the claims that it is important for their children's future to use digital learning tools such as the iPad and whether they encourage their child to learn new things via the iPad. These two questions are categorized as parental opinions.

The other two questions are about parents' assumptions about their children. One question is a statement about whether their children seem more motivated to learn via iPad as a learning tool and the other is whether they think their child prefers digital learning on an iPad rather than learning without digital tools.

Regarding the parents' opinions on the two statements, 71,5% of the parents are positive about digital learning, with a mean of 36,5 of the parents who are positive of 51 parents. A relevant detail here is that although the vast majority of parents are positive, the 7 parents who are negative on one of the two statements have 5 of them (71,4%) answered that they are negative to both.

Furthermore, with the statements concerning the parents' assumptions about their children, there was a mean of 33 positive parents, ie 64,7%. On the claim that parents believe their children prefer digital learning to learning without digital tools, however, 21 respondents are either neutral or negative. This is thus the claim with the most that are not positive. This may have something to do with the fact that it can be difficult to respond to a statement based on the children's preferences. In a previously presented source, Clark and Luckin, on the other hand, stated that the iPad in many ways motivates and engages pupils, and keeps their concentration and interest in the content for longer (2013).

An important detail is that 4 parents have been negative to all 4 claims about their perception of their children's digital learning. However, there is no connection between these parents, there are both women, and men, highly educated, low educated, and with children in different school coffers.

Previously presented theory described digital technology as systems or devices such as mobile phones (Victoria State Government, 2019). Based on the insight from the survey, it is not surprising that it is the mobile phone that is used most frequently, where all of the parents use the mobile phone either every day or as often as every hour. All parents except one also use a PC relatively often, while a few (27,4%) use a smart house device.

Plowman et al. (2010) stated that most parents had ambivalence about the ways technology can be either beneficial or detrimental to their children. This reflects the survey where the vast majority of parents are positive about technology, but they also have concerns, that were talked about in the previous research question.

In response to the research question about what the parents' perceptions of digital learning are, it can be answered based on the digital survey that parents are to the greatest extent positive about digital learning.

RQ 3: How do parents get involved in their child's digital school work?

The next research question is about how the parents get involved in their children's digital school work. To answer this research question, both the interview and the digital questionnaire were used as methods. From the teachers' perspective in the interviews, the main focus on parents is how they participate in digital learning, whether it is through the smartphone, computer, or possibly an iPad. The informants describe that it is very different for each parent how involved they are in the children's digital school work. Based on the informants' speech, it also varies greatly whether the parents participate in the parent folder on the children's learning platform, where all parents have access through a code. Some informants also point out that some parents sit with their children when they use the iPad to do homework.

In the questionnaire, the parents were asked questions about interest, commitment, and participation in the digital learning platform. One question is a statement about whether the parents are interested in what the child does with digital learning on the iPad, and the other question is a statement about whether they support and get involved when the child uses the iPad as a learning tool at home. The meaning of these two statements is that 46 (90,1%) parents are positive and believe that they themselves both support, get involved, and show interest.

In the interviews, there was talk about the parents' participation in the learning platform the children use, and it was felt that it was a barrier whether the parents took part in the learning platform. The survey showed that 39 (76,4%) of the parents use the learning platform as actively as they want and that only one parent does not. The rest are neutral. This means that this survey is not as varied as it emerged in the interviews.

According to previously presented sources, it is up to each individual parent how much they want their children to be involved in the digital world (Livari, 2020). It was also stated that parents have an important role in children's digital life and learning (Edwards et al., 2018) and that parental involvement is considered to be critical for children's success in the use of digital tools (Sonnenschein, Grossman, and Grossman, 2021). Parents should thus help and facilitate their children with schoolwork at home on digital tools such as the iPad (Mantilla & Edwards, 2019). These theories agree well with the survey where it seems that parents both see the importance and are aware of their role in children's digital learning by showing interest and support.

In response to the research question, most parents are both interested and engaged in their children's digital schooling, and the parents are involved by taking part in the parent folder on the child's digital learning platform.

RQ 4: Do parents have enough basic digital skills to be able to assist their child in digital school work at home?

A research question was asked about whether parents have enough digital competence to assist their children in digital school work at home. Here, aswell, both methods were used to find answers. In the interviews, the teachers 'perceptions of the parents' digital competence were desired, but in the questionnaire, the goal was to find out whether the parents have the necessary digital competence. The parents were thus asked a series of questions where they should rank their own skills. Here, the variables were high or low digital competence, or neutral. Two of the questions were whether they could use digital devices to complete tasks or use online resources to search for information.

None of the parents who answered the question can be ranked as having low digital competence. On the other hand, 5 of the respondents have answers that they are neutral, which may mean that they either did not understand the question or did not want to answer.

Furthermore, the parents themselves should answer whether they have the digital competence needed to help and support their child with schoolwork on digital tools such as the iPad. Here aswell, no one categorized themselves with low digital competence, while 3 reserved neutral and one did not want to answer. The remaining 47 believed that they have the necessary digital competence.

When the parents had responded to claims about themselves, they were asked about their impression of the other parents in the parent group's digital competence, and whether they believe that there are different levels among the parents. 37 (72,5%) of the parents believe that there are differences in the form of low and high digital competence among the parent groups.

This is an interesting finding based on the previous questions where 47 parents believe that they have a high level of digital competence. This can either mean that the parents think they have higher digital competence than they actually have, or that the parents think that other parents in the children's class have lower competence than they have.

It was also revealed in the interviews that most parents have high digital competence, but that in a parent group there are always some who have low digital competence. Voices from informants express that it is especially noticeable in children who have slightly older parents, that many often do not have the digital competence needed. Then they do not participate due to lack of competence, This is not something that came up in this survey where there is a high-frequency distribution with parents from 28 to 62 years, where the age has had no input on the digital competence.

In the presented theory, Udir (n.d.d) explained that to assist and guide children, adults around the children should know how to use digital tools responsibly.

Other sources presented that digital competence is about being able to understand a set of knowledge, skills, abilities, stances, and values that an individual needs to use digital technologies and digital media for usage (Kmecová, 2019). The user, in this case, the parents should be able to use digital resources appropriately and responsibly to solve practical tasks (n.d).

The research question can thus be answered based on the insight that the parents who responded to the survey believe that they have a high level of digital competence and to a large extent facilitate digital learning at home in several areas.

RQ 5: How do parents appropriate technology at home?

The next research question is about how the parents appropriate technology at home. In the questionnaire, the parents were asked about whom they facilitate to a digital learning environment at home by appropriate technology. This is categorized into the three variables: facilitates, do not facilitate and neutral. There were a total of 5 claims, that is compressed into two categories, three of the questions were about procuring hardware, having a printer, and assisting with a sensible choice of sources. The last two were about strategic time constraints or location.

Within the category of strategic time limitation and placement, there is a mean of 36 parents (70,5%) who believe that they are facilitated by having these strategies for their children's use of the iPad.

The three remaining categories are in greater disagreement, with a mean of 42,5 (84,3%) of the parents having acquired relevant hardware and assisting with a sensible choice of sources, while only 23 (45%) are facilitated in having printing options available at home, a relevant factor here is that there are very many who do not have printing options at home, but at the same time are afraid that the children will get poorer handwriting.

In their daily routine, all parents use their smartphones every day or every hour. Only one parent never uses a PC, while 68,7% use it every day. Few of the respondents use iPad / tablets and smart house devices frequently.

All of the parents who participated in the questionnaire had access to the internet at home, whereas 3,9% (n = 2) had tele line. This means that digital exclusion is not the case among the responding parents. In previously presented theory, Fjørtoft describes that Norway is at the top in Europe in the usage of digital tools and Internet use, where 93% have internett access and a computer at home (2020). This finding agrees well with the insight where all participants have some form of internet access at home, and all except one parent use a computer.

The vast majority of parents facilitate a digital learning environment at home. This means that parents in many ways acquire technology at home, both through devices they use themselves and through procuring hardware, having a printer, assisting with a sensitive choice of sources, and strategic time constraints or location.

RQ 6: How is the iPad used as a digital learning tool in Norwegian primary schools?

Another research question to be answered was how the iPad is used as a digital learning tool in Norwegian primary schools. To get an answer to this, teachers were interviewed. In school contexts, both pupils and teachers use the iPad. The informants described that they use the iPad to a large extent for communication. Through the iPad, they communicate with pupils, parents, and colleagues. Based on the interviews that were conducted, it is understood that it is up to each contact teacher how they want to use the iPad, based on their knowledge, relevance, and usefulness.

Among the findings in this thesis, there is a voice that says that the iPad is very useful when it comes to conversations with parents, where all the information about each pupil is gathered in one place, rather than distributed on many different sheets. Another voice believes that the iPad is an ingenious tool for customization.

All informants use the iPad daily and connect the iPad via airplay to smartboards where relevant information such as presentations or other desired material can easily be visually communicated from the teacher to the pupils.

It is also described that via learning platforms, teachers publish learning plans, and homework, share assignments and give out other important notifications. Different platforms that are used based on the informants are Vigilo, Teams, and Showbie. Via Vigilo, parents receive a weekly email from the teacher with information. The pupil's learning plan is also posted on this platform and parents can report their children's sick leave. Most parents use their smartphones to use Vigilo. Other informants use Showbie as a learning platform, which consists of two folders. Of these, one is a school folder, and the other a home folder. Her parents have access to the home folder, and the pupils have access to the school folder. The teacher has access to both.

There are also mentioned several different applications that are used on school iPads. There are different applications for different subjects and different purposes. An application that has been mentioned by all informants is the book creator app. Through this application, pupils can create a process book of their work. Different books that the pupils make on this application are letter books, audiobooks, math books, art books, and sketchbooks. Other activities that can be performed on this application are mind maps, reading, inserting pictures, and writing.

In the background chapter, it was presented that the majority of 1:1 implementation models are driven by a collaboration consisting of the state (national education authorities), the municipal sector (school owner, school management, and teachers), and the providers of digital solutions and services (NOU 2020: 12). This is something that is also reflected in the interviews, where the informants claim that it is the various municipalities that decide which applications can be downloaded to the iPad.

It is also the teacher who decides which applications to use for which subjects, and they can follow what the students have done at home, and what they are talking about, on the iPad. Another source stated that iPads in many ways can support seamless learning, by easily allowing learners to switch learning contexts (Clark and Luckin, 2013), this was also mentioned by informants who believed that the iPad was a useful tool for keeping control of information and view relevant information quickly.

Something that was also mentioned from the insight was that the iPad is a useful tool when it comes to parent conversations, where all the information is in one place, instead of many sheets. This is something Clark and Luckin also stated when they presented that it was reported by parents, pupils, and teachers that communication features, accessibility, and routine availability of iPads in the classroom and the house of the pupils make the communication between teachers and the pupils, and the school and the parents easier and much more routine (2013).

The research question can therefore be answered by saying that the iPad is used in many ways as a learning tool in Norwegian primary and lower secondary schools. It is used by both teachers and pupils through the school's learning platform. It is used by students as both a textbook and a tool where students do schoolwork. Teachers use the iPad in teaching and parent-teacher conversations.

RQ 7: To what degree are the parents motivated to take part in their children's learning on digital platforms?

The last research question was about to which extent the parents are motivated to take part in their children's learning on digital platforms. An attempt was made to obtain the answer to this through the digital survey. Here the parents were asked about motivation and participation.

In a statement about whether parents are motivated to take part in their children's learning on digital learning platforms, they were categorized into high and low motivation, and neutral. Here, 2 parents answered that they had low motivation, one was neutral, and the remaining 48 (94,1%) believe that they have high motivation.

The parents were also asked how often they check, read, or are active on the digital learning platform to check if the motivation is related to the commitment.

A mean of 20,3 (39,2%) goes in and checks if something new has been posted on the learning platform every week, while a mean of 26,6 (50,9%) checks as often as every day. This means that a total mean of 46,9 of the parents takes part in the learning platform either passively or actively every week or day, which is in good agreement with the high motivation of 48 of the parents.

An interesting insight is that although 32 (62,7%) of the parents answer that they feel included in the use of the iPad as a learning tool in school, 35 (68,6%) claim that they have not had any kind of training in the use of the iPad or learning platform, which also tunes according to the teacher's speech in the interviews, so still feel. This means that the parents feel motivated and included in the use of the iPad, even though the majority have not received any kind of introduction.

A natural thought to come is that those who may not be motivated to participate in the learning platform or in general in the child's use of the iPad as a digital learning tool, may not be motivated to conduct a questionnaire on the topic. In a previous theory, it was stated that the parents who have low self-esteem when it comes to the use of digital technologies, probably have a lack of motivation to try using them (Sun, 2008). In the case of the parents who answered the survey, it thus seems that they are motivated to take part in the children's use of technology, perhaps precisely because it is something they feel they master with their high digital competence. Another theory (Mitchell et al., 2012) pointed out that the motivation for using technology is about acceptance, use, and satisfaction. This means that for parents to be motivated, they must have some form of acceptance of their children's use of the digital tool and see the usefulness of the iPad. Based on the survey, parents are motivated to take part in their children's digital learning and they view the iPad and digital learning positively, even though they also have skeptical aspects about its use.

In response to the research question of whether parents are motivated to take part in their children's digital learning, most of the parents who responded to the survey are motivated.

Concluding thoughts

It can be discussed whether interviews with parents should have been conducted rather than a survey in order to get more in-depth answers and have the opportunity to ask follow-up questions. After taking a few rounds on this, it was concluded that this can be a sensitive topic for many, and in personal interviews, it can be embellished on the truth, and that one may not want to state how little involved and motivated one is, rather than in a survey where you sit anonymously behind a screen and perhaps dare to be honest with yourself when you can think carefully before answering.

In the analysis of the research questions, it was also looked at whether there were any major differences or pattern findings when it comes to men and women, as well as age differences in the categories over 38 and under 38 since it is the average age of the respondents. An attempt was also made to find a pattern as to whether those who have their first child in first grade are more similar in attitudes than the remaining parents, as well as those who have 2 children in primary school. No clear patterns were found for differences in digital competence when it comes to education level.

5.2 Initial expectations for discoveries

Some of the expectations for the thesis have been answered earlier. In this section, the thesis deals with a brief description of the expectations that were described initially. Through the domestication theory it was expected to investigate how the introduction and usage of digital tools, and the understanding of the digital learning tool iPad is in households of parents with children in Norwegian primary schools.

This master's thesis was expected to explain and reflect on the theme of iPad in primary school. It was also expected to take a closer look at how the iPad is used as a learning tool and how digital learning is for the benefit of children and parents in the digital world we all live in. These points have been answered and it was found that parents use the iPad to a very small extent on their own, but they help their children when they use it.

The thesis assumed as a starting point that digitization and technology are not something that everyone finds easy and that some parents may feel that they do not have as high digital competence as desirable when the children's digital school work is to be followed up. In the insight, it was found that the vast majority believe that they have high digital competence, but that both in feeling the parents themselves, and teachers always in a parent group are someone with low digital competence.

There was an expectation that the participants shared opinions when it came to the new digitalization in primary school, and then specifically with the introduction of the 1:1 iPad would also emerge in the insight phase in this thesis. These expectations has been fulfilled.

It was also assumed that the skepticism and debate that took place when the iPad was introduced may have changed since then. Furthermore, there was an expectation that more understanding and acceptance has arisen, but at the same time, there were many who had negative attitudes about the use of digital tools such as the iPad in school. Based on the findings, it can be said that the parents accept the iPad as a learning tool and are generally positive, but that they are nevertheless concerned about the children's use.

5.3 Summary and reflection

Discussion of answers to the research questions

This thesis has been investegating the role of parents in children's digital learning at home from a domestication theory perspective. To summarize the answers to the research questions, 27,4% of the parents are to some extent skeptical, which was assumed was that since the majority were not skeptical, it was assumed that most parents are not worried either. This was rejected, however, as 55,6% of the parents turned out to be concerned. This could indicate that the parents initially thought they were not skeptical, but later when they were given allegations of various concerns, they felt a concern anyway. This means that parents are still concerned, about both physical consequences, the differences between the children due to the parents' digital competence, and the negative impact the technology has on their children. It is also conceivable that the parents who responded to the survey separate the concepts of skepticism with concern to a greater extent than assumed. On the other hand, it was very startling to gain insight into the fact that the teachers do not perceive the parents as worried, even though the majority of the parents who responded to the survey are to some extent concerned about the children's use of the iPad as a learning tool.

Although most parents are perceived as skeptical, the insight also showed that the vast majority of parents are positive when it comes to digital learning and that most parents are both interested and engaged in their children's digital schooling, and the parents are involved by taking part in the parent folder on the child's digital learning platform. According to both themselves and the teachers, the parents also have a high level of digital competence and greatly facilitate digital learning at home in several areas. The parents are also considered motivated to take part in the children's associated learning platform and in general in digital learning.

Visualization model

The mentioned research questions are now put in context with the domestication theory. To visualize this, a model of domestication theory in primary school, from the parents' perspective have been created (figure 9). The model shows the beginning of the problem. Where there were guidelines from the government for digitization in primary and lower secondary schools. This digital learning is something the teacher must take responsibility for and facilitate and guide the students' digital learning, as well as inform the parents about what and why their children should do on the shoe through the home-school collaboration for the student's best. Furthermore, the model puts the parents as the target group in the center and shows how different attitudes and perceptions arise and how these affect each other to positive and negative degrees.

The domestication theory is about analyzing how technology has been introduced and integrated into society, as in this thesis is how digitization in primary school, more specifically digital tools were introduced and integrated into the parents' lives. Although several digital tools are used in school, it is the iPad that students use the most and take home after school, and thus integrate into the home. Domestication is as mentioned earlier, most often described as a process of four phases: appropriation, objectification, incorporation, and conversion (Figure 8) (Silverstone, 1994).

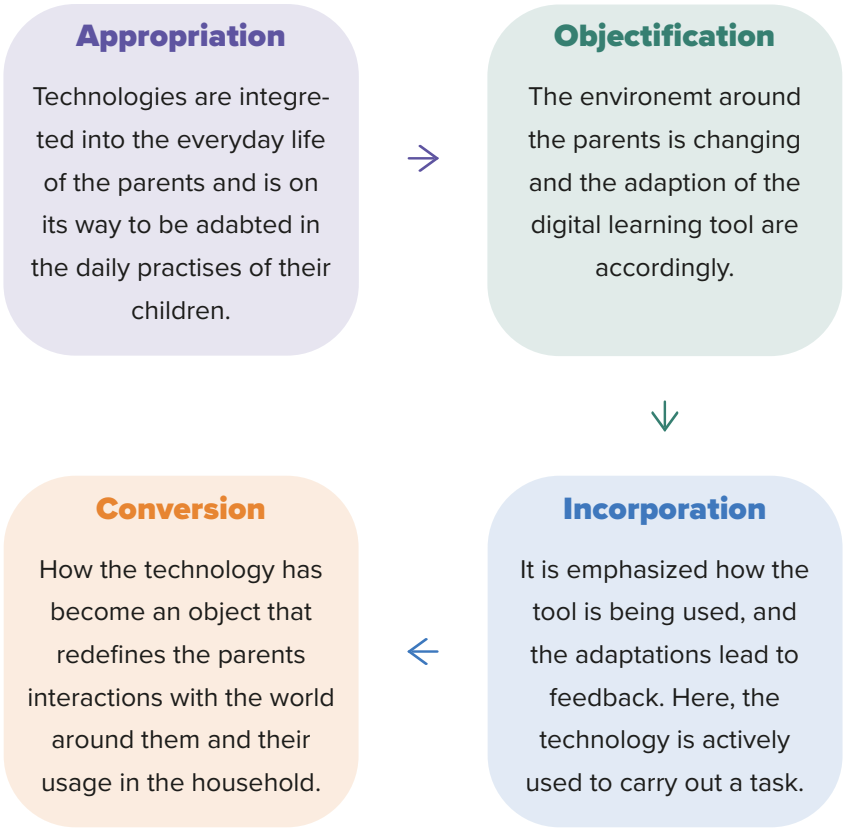


Figure 8. Phases of domestication

In figure 9, it can be seen that the first phase domestication, appropriation, contains two research questions. Appropriation is as described earlier about how the technology, or in this case the iPad, is integrated and adapted into everyday life and daily practices. In this phase perceptions, a reason for the acquisition, and what the acquisition is expected to yield are included. The iPad was introduced to parents through school, which received guidance from the government's digital action plan. As mentioned, this created discussions and brought with it mixed attitudes, both positive and negative, as research question 2 illustrates. This phase is also about how the parents appropriate technology at home. Research question 5 illustrated whether or not parents facilitate a digital learning environment at home.

Furthermore, in the next phase, objectification is about how the parents and the environment around the parents change. In this phase, the parents must find the digital tool useful and practical, thus asking research question 4 about digital competence, to find out if the parents have the digital competence that is necessary to assist the children's digital learning. The iPad also goes from being a thing to becoming a personal item. In this phase, different values also arise through the presentation of the new digital tool. The previously mentioned attitudes in the first phase lead to concerns. This is where research question 1 comes into play, where parents' concerns about the iPad arise. This phase also deals with where the parents place it in the house and the time structure. Both of these factors vary greatly based on the survey. Through the interviews, it was established that the children take the iPad home. It was stated earlier that the vast majority of parents have both a strategic time limit on the iPad for the children's use and a strategic location of the iPad, such as that it can not be in the children's bedroom in the evening.

The third phase, incorporation, as mentioned earlier, it is about how the ICT is being used, and the time aspect. It is also suggested that for an artifact to be informed, it should be used actively, as a performance of a task. Research question 3, which deals with how parents get involved in their children's digital schoolwork fits into this phase, where the parents either show interest or do not interest.

In the conversion phase, the digital tool is as mentioned becoming an object which redefines the relations to the world around. This phase is also about how the digital tool is used in different areas and whether one takes part in its use. This phase deals with research questions 6 and 7. Research question 6 is about how the iPad is being used as a digital learning tool in Norwegian primary schools. Here, knowledge of how the iPad is used in practice by the various actors (teachers, parents, and pupils) was acquired. From the parents' perspective, this is about how they use the learning platform that belongs to the child, where messages are given and the student's work is published. In the model (figure 8), it can be perceived that the parents then either participate or do not participate in the learning platform, which has been concluded earlier in the thesis. The last research question is about the extent to which parents are motivated to take part in the mentioned learning platform, which was divided into low or high motivation. This motivation for participation is something the parents do after the digital tool has found its place in the environment and overall motivations can then be measured.

Although the domestication theory consists of phases, within which the research questions are divided, all the phases and research questions are connected in the form of influence, this is indicated by the lines drawn through the various claims and the influencing factors.

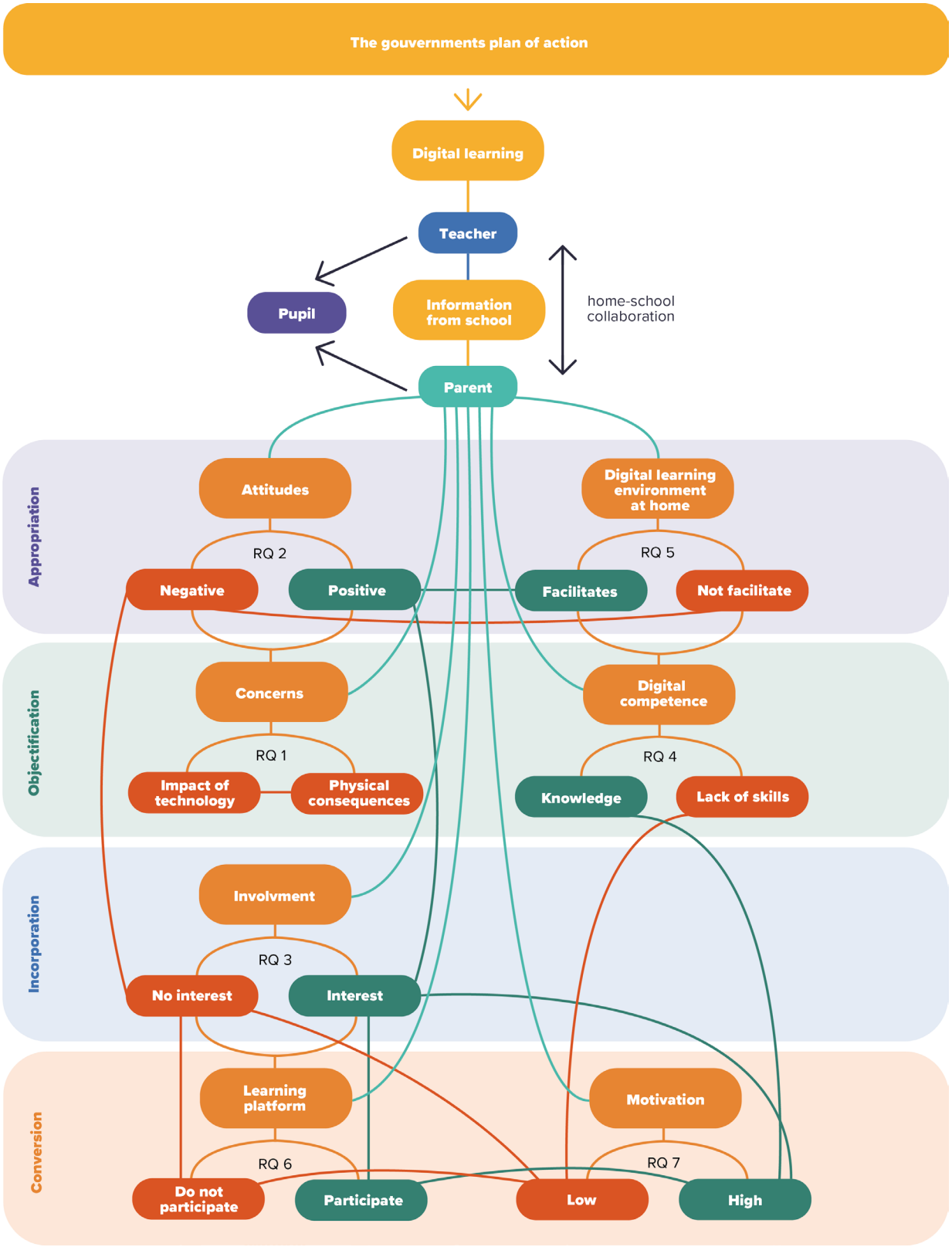


Figure 9. A model of domestication in primary school: the parents perspective

Summary of discussion

The iPad plays a central role in this master's thesis, more specifically what perceptions parents have about its use and how it is used in school and perceived. In short, the iPad is used to a lot of different things in the school context, both by the teachers and by the students. As previously presented, the implementation of the iPad in primary school were driven by a collaboration consisting of the state, the municipal sector and the providers of digital solutions and services (NOU 2020: 12).

As described earlier, some of the methodologies were inspired by a previous study on *Parents' perceptions of e-learning in school education: implications for the partnership between schools and parents* (Siu-Cheung Kong, 2018). That study concluded that it should be looked at more closely whether a comprehensive school policy might be proposed. The previous study by Jenssen and Faugstad also described teachers largely developing their practice in school-home collaboration, and that the room for maneuver is influenced by the teacher's wishes and perceptions about the topic that may lead to school-home collaboration not only varying from school to school but also varies within the same school (2019). It can then be asked whether there is too much freedom around the choices teachers can make on their own around the use of digital tools in school?

Nevertheless, since the teachers have different interests, levels of digital competence, and digital interests, this should of course be taken into account when it comes to the use of digital tools themselves in their workplace. It can not be expected that all teachers will be able to keep up with the technological development and that teachers should be able to shape their digital learning methods in teaching. However, this creates a risk of increasing the differences from teacher to teacher and goes beyond students 'opportunities for interaction with digital tools and parents' understanding and involvement in their use.

At the same time, the guidelines on digitalization in primary school come from the authorities, and perhaps a greater responsibility should be placed on the fact that it is precisely the authorities that responsibility should be shifted towards, in the form of better resources and training. Although the teachers are not the focus of this master's thesis, it is the teachers who lay the foundation for the parents' children in digital learning every day. This is also something that goes both ways, that there can be a skewed distribution of digital competence, in that students at school meet great support and commitment around digital tools, but do not have access to relevant and necessary equipment or digital support at home, which can limit children's digital development.

The great freedom that teachers have around the use of digital tools, specifically the iPad, can also lead to great differences between siblings who go to different stages, but at the same school.

Where one child receives good training and development in the use of digital tools, but a sibling in another stage, with another teacher who does not use digital tools to the same extent, develops a later digital understanding and may feel lagging behind when it comes to learning new features on digital devices. This can create unnecessary digital differences in the same household. The variation that is mentioned thus does not apply at the regional or county level, but also to municipalities and within municipalities. There should be room for the teacher to be creative, but also that there are certain guidelines that should be followed to create a community and level of learning across the country's schools.

Brochmann's opinions on this were presented earlier, in which the parents were only told that the children should start using the 1:1 iPad, but not why it should be used (2020). Thus, information and knowledge about the use of the specific tool should be given to the parents, so that they can understand what the teachers are doing to prevent their worries of the parents. But then there must first be good communication between the parents and the erne so that by knowing what concerns the parents have, the teachers can facilitate.

Relevant thoughts that emerge based on the findings that have been obtained are that the parents feel included, are overall positive about the usage but they are still concerned. Other questions that arise are the concerns about sleep problems and vision as negative factors to the child's use of the iPad, but at the same time, many parents do not have any kind of strategic time limit or location of the iPad. This means that the children can be very much on the iPad, even if the parents are afraid of the child's vision, and that the children can take the iPad with them to the bedroom and perhaps use it before bedtime. Screen use before bedtime has been proven poor for sleep quality due to the iPad's light on the eyes (Edwards et al., 2018). Maybe this means that the parents do not have enough knowledge about how to deal with the worries and what can prevent the negative factors the iPad brings with it?

In the thesis, it was also desirable to dive deeper into the digital learning platforms, but as this was not feasible for privacy reasons in the various inquiries, it was not emphasized. However, the task will encourage teachers to involve parents in the design of rules for using the iPad, and information on how the various concerns teachers can prevent are prevented at school. Other concerns can only be addressed by the parents themselves, but there should be an open dialogue in the parent group and with the teachers, who should be knowledgeable spokespersons with recommendations. The thesis sees in retrospect that other results could have been desirable in the form of changing a question in the survey that deals with inclusion in children's use of iPad as a learning board. This is a question that can be misunderstood that the parents feel included by their children, but here the goal was to find out if the parents felt included by the school.

5.4 The way forward

Concerning the domestication theory and the answers to the research questions, it can be observed that there is one notch in domestication in primary school from the parent's perspective. There is overall positivity and the majority of the parents have both positive attitudes, facilitate a digital learning environment at home, have digital competence, show interest, participate, and are motivated. Overall, domestication is thus good, but there are concerns that stand out as a factor of contrast to the other claims, where the parents are largely concerned. Thus, this is exactly what should be focused on further (Figure 9).

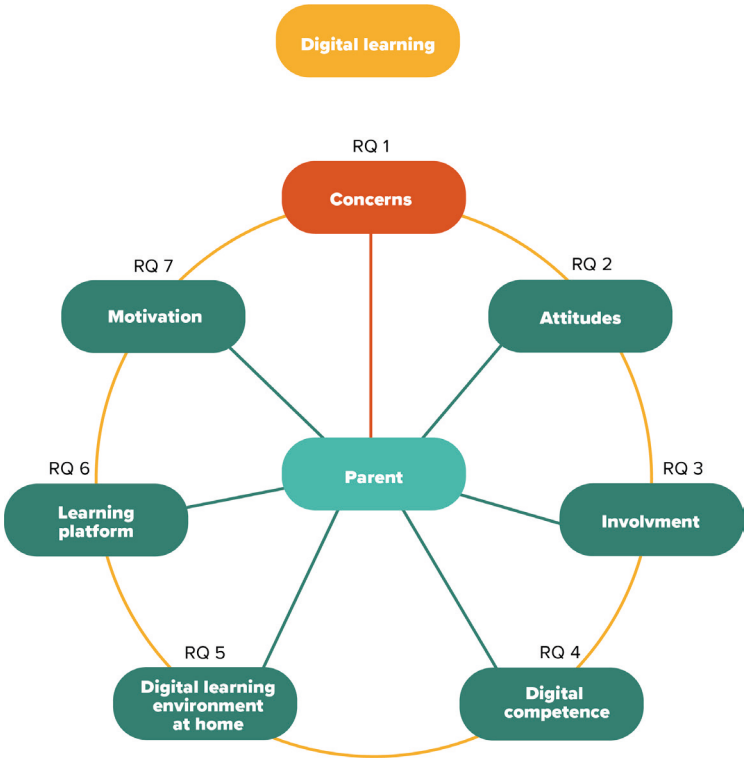


Figure 10. A wheel of parents role in children´s digital learning: perceptions

As previously presented, this task builds on the skepticism of digital learning, and especially the digital learning tool iPad was met with by many parents when it was introduced. Introductory in the thesis it was presented that it was assumed that the skepticism and debate that took place when the iPad was introduced in primary school (2017) may have changed and that there has been more understanding and acceptance as the tool has been in use for some time, but it was also expected that there are exceptions that are still against the use of digital tools such as the iPad in school.

Looking back on this claim, it can be stated that the vast majority of parents are positive and understand the usefulness of using the iPad, but even though they are for the use, they are still concerned. This thesis wants to invite more dialogue across the national, regional, and municipal levels where employees at the primary school and parents, as well state and political voices can discuss digitization in the primary school. This is a discussion that is already on the agenda, but the angle of discussing the role of parents and their concerns should be clarified.

This thesis started with a hypothesis that the iPad in primary school as a digital tool is something that will be used in the future.

As a further proposal is to be designed in the thesis for how parents' concerns about digitalization in primary school are to be addressed, it is relevant to look at where the parents are already represented in the school. Statutory parent representatives in the school are the Parents 'Council and FAU, the Cooperation Committee (SU) / Operations Board, the School Environment Committee (SMU), and the Parents' Committee for Basic Education (FUG). Parents are also represented as Parent contacts (class contacts), but this is not required by law (Udir, n.d.c).

The cooperation committee, FAU, and possibly KFU, will be involved in the decisions on the use of digital tools. However, they can not demand to be right, but their views must be heard before the school decides. All parties depend on good cooperation to succeed in positive digital school life. (Parents' Committee for Basic Education, 2021).

The parents 'committees' websites state that it is through the committees that the parents can report any concerns and challenges and that all parents need training and information about what is being introduced, how, and why. It is also claimed that the digital world can be confusing and unknown to parents and that it is important that the school provides parents with enough information and that they become involved in the process (Parents' Committee for Basic Education, 2021).

This is summed up by the fact that it is required by law for the parents to be involved and have a voice, but when it comes to the focus of this task which has become the parents' concerns, the parents must report any concerns to these channels. Then the following questions arise, what if relevant and common concerns can be informed, rather then asked?

This means that the task is raised at a national level. Every county, every municipality, every school, and every teacher uses digital tools as they wish, within given limits. It can thus both be relevant that overall concerns can be explained how these are facilitated and how these are tried to be prevented at a national level, but that also specific concerns can be informed about in the various municipalities and schools through what they do to prevent.

It is worth emphasizing that this task comes with a proposal for a solution and that it is by no means completely developed. This must be evaluated by a real need for this resource, as an extension of this task.

Design proposal: a way toward minimizing parents concerns

6. Contribution

The design proposal is seen as suggestions to reduce parents' concerns and show how it can be facilitated to know how concerns about digital learning are taken into account and what is being done to avoid as many negative factors as possible. This chapter presents a result of the proposal described in the analysis, which is based on the findings in this thesis. This is an example of a proposal, and it is believed that this can initiate ideas, and better versions for parents' inclusion in primary school and focus on parents role in childrens digital learning.

6.1 Empirical findings

Before the process continues, a summary of the findings is provided. Both qualitative and quantitative methods were used to gain insight. This data was analyzed and interpreted through transcription of interviews and then transfer to post-it notes and an affinity diagram. The findings from the digital survey were analyzed through the computer matrix. Many relevant and useful findings were obtained here, which are presented earlier in the thesis. The overriding finding that is the basis for this part of the thesis is the domestication theory of the parent's role in the children's digital learning. It was concluded through the research questions that parents generally have a central role in their children's digital learning, although they are not always mentioned informal contexts. They also have overwhelmingly positive attitudes toward digital learning, have a lot of digital knowledge, and are motivated, to participate in and facilitate digital learning. However, they are concerned about various factors of digital learning tools that the iPad brings with it.

6.2 The upcoming process

In order to arrive at which requirements that are needed to create the best possible design proposal based on the insight, the requirements definition process is carried out (Cooper et al., 2014). This is an iterative process that will provide answers to what the upcoming design is and what it will do by meeting the user's goals. In this design concept interaction design principles is used as a common thread in the forthcoming proposal.

Figure 11. The Requirements Definition Process (Cooper et al., 2014)

6.3 Problem statement

It is important to understand the problem before coming up with a proposed solution. To begin summarizing the understanding of the conducted research, a problem statement was created based on the following 5 questions.

What is the problem?	Parents with children in primary school are concened about the impact of digital learning tools on their children.
Who is experiencing the problem?	Parents with children in primary school (First to fourth grade).
Why does the problem occor?	The problem is that the worries are not put in focus and that not all teachers are aware of the parents' worries.
When does the problem occur?	When children use digital tools and 1:1 iPad at school and home.
Where does the problem occur?	Digital learning was introduced in primary school, and children use digital tools and 1:1 iPad in everyday school life both at school and at home.

The overall and introductory problem stament for this master thesis was to find out what the role of parents was in children´s digital learning, and how digital learning is perceived and included at home from a domestication theory perspective. The role of the parents was investigated and answered earlier.

When the task now in the proposal part has been narrowed down after it was found out where the shoe pressed in the role of the parents, it is necessary to create a new problem statement for the design proposal.

With this in mind, and the previously presented findings the problem statement is: **How to take parents' concerns regarding digital learning seriously, and show how these can be taken into account, as well as what the school does to facilitate to reduce them.**

6.4 How might we

As mentioned earlier, this master's thesis follows interaction design principles as a common thread in the forthcoming proposal. Design is about understanding the user's needs, motivations, desires, and context, as well as understanding opportunities, requirements, and constraints (Cooper et al., 2014). Through these principles, the goal is to come up with a proposal that is perceived as useful, usable, desirable, viable, and especially feasible.

By creating how-might-we questions, a proposal can be generetad while focusing on the right problems to solve (Rosala, 2021). Challenges can also be turned into design opportunities for the upcoming design.

> **HMW** reduce parental worries through a digital design proposal?
>
> **HMW** inform parents about how to ensure their children's digital learning and reduce any negative factors?
>
> **HMW** convey an informative message to parents in a useful, relevant, reassuring, and informative way?
>
> **HMW** ensure that parents across schools and municipalities receive equally important information and follow-up?

6.5 Brainstorming

To form a basis for what design requirements and principles are needed, a brainstorming session was completed. The brainstorming session was based on the how might we questions and the collected insight. Through this brainstorming session, it was found that parents concerns regarding digital learning should be focused on both on national level and within the municipalities. The solution that will be outlined is at the national level, where general information about the parents' role and overall concerns about digital learning are informed.

Municipalities are thus encouraged to integrate this information where they share parental information, whether it is on the municipalities' websites about schools, or the learning platforms. As schools use different learning tools, and some schools are further ahead when it comes to the use of digital technology in schools, each school must adapt its information based on this.

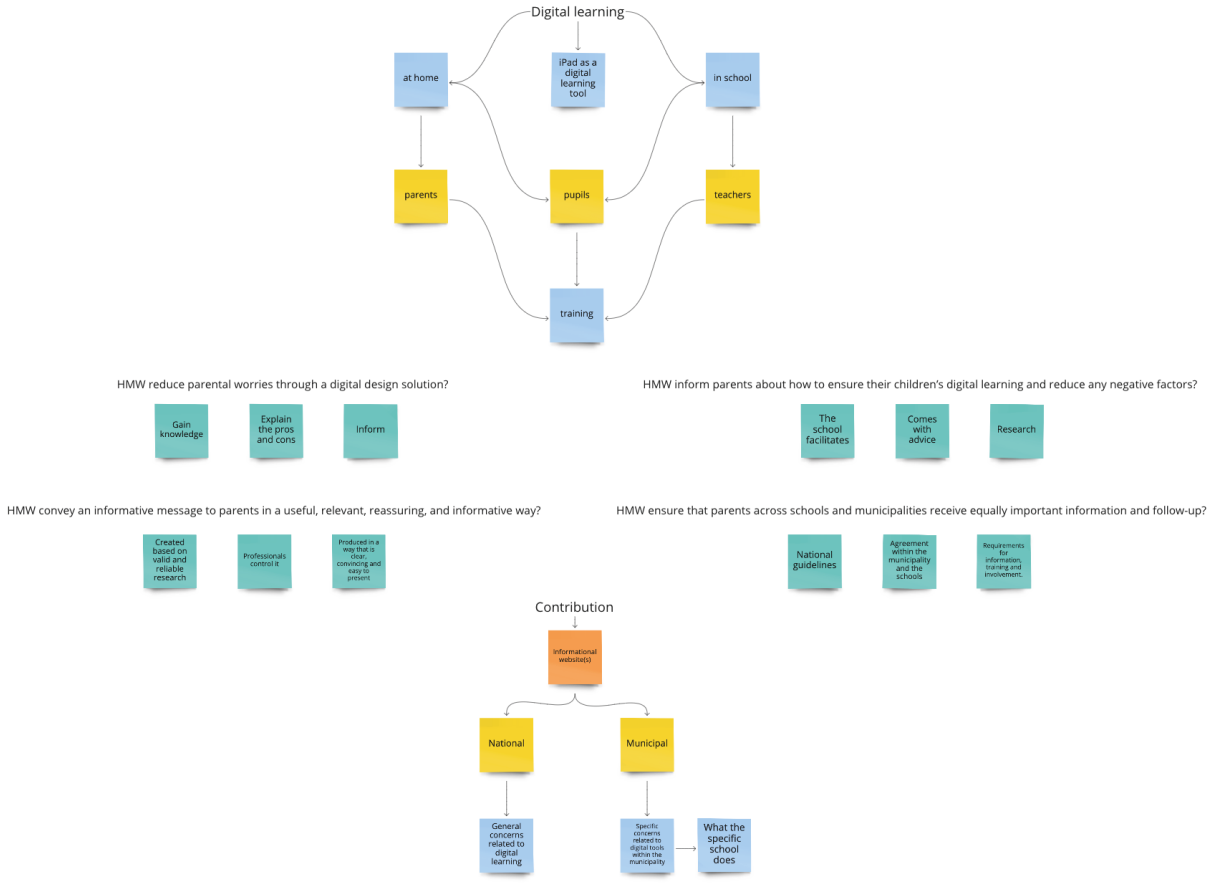


Figure 12. Brainstorming session

6.6 Target group into profiles: personas

Based on the results from the interviews and the digital survey, the parents from the insight are divided into different profiles in the form of personas. These archetypes are relevant to discuss in order to investigate whether principles should be different when targeting the different users in the target group.

Personas

A persona is a fictional character, created to describe a typical user (Baxter et al., 2015). These personas are based on the overall insight from the project's informants and respondents (Preece, Sharp, and Rogers, 2015; Stickdorn et al., 2018). Personas are useful for deciding what the proposal should do, communicating with stakeholders, building commitment to the design, measuring the effectiveness of the design, and contributing to other efforts (Cooper et al., 2014). By creating the characters, it becomes difficult to create and design based on the designer's motivation and goals.

The characters have user goals divided into three different categories based on Norman's three-level theory of cognitive processing (Cooper et al., 2014). Personas have life goals, which are who the user wants to be, end goals which are what the user wants to do, and experience goals, which are how the user wants to feel.

By forming personas, it becomes to implement a better understanding of the typical parents. The grades will provide a visualization of different types of parents' motivations, concerns, needs, skills, and opinions that can be inserted into fictional grades that can indicate typical parents of children in primary school.

In this project, 3 different personas have been created, representing 3 different parents. Scenarios will also be designed based on these personas to create realistic situations in user experiences (Baxter, Courage & Caine, 2015).

Ellen

General

28 years old
Parent to a 2nd grader
Lives in a large city, Oslo
In a relationship
Educated in Economics

> **I check the learning platform every day to see if the teacher has posted anything new.**

Motivation

I am motivated to assist my child with digital learning, as I myself know how useful and important it is to be a digital citizen.

Need

I wish the other parents in the class could also understand how much positive the iPad does for learning.

Concern

I find it scary that my child can find inaccurate information online, which leads to incorrect knowledge.

Technologies in daily routine

Smartphone
PC
iPad
Smart house device

Goals

Life goal: Be someone that others see as very digitally competent.
End goal: Motivate more parents to take part in digital learning.
Experience goal: That my child masters digital technology in a responsible way.

Digital competence

Excellent — non existing

Marcus

General
37 years old
Parent to a 1st grader
Lives on the country side, outside of Gjøvik
Divorced
Trade certificate as a Plumber

> **My child is not allowed to use the iPad in the bedroom.**

Motivation
I am motivated to look at the digital learning platform to get important information and get to know what my child does at school.

Need
I wish I could get more concrete information about how the children came to use the iPad at school, and what is expected of me as a parent.

Concern
I find it worrying that my child will not be able to write properly by hand in the future.

Technologies in daily routine
Smartphone
PC
Smartwatch

Goals
Life goal: Continue to participate in the digital learning platform.
End goal: Will facilitate a digital learning environment at home.
Experience goal: will feel safe letting my child use digital tools at school.

Digital competence
Excellent — non existing

Anne

General

46 years old

Parent to a 3rd and 4th grader

Lives in a small town, Røyken

Married

Works in a clothing store

> **My kids seem very motivated to do homework when they get to use their iPads.**

Motivation

I'm motivated to show as much interest as other parents when it comes to digital learning on the iPad.

Need

I wish the teachers of both my children could use digital tools in the same way. One of my children is jealous of the other who gets to do more fun things on the iPad at school.

Concern

I'm worried my kids will sleep worse at night when they're so much on screen.

Technologies in daily routine

Smartphone

PC

Goals

Life goal: A great role model in the digital world for my children.

End goal: Understand the positive impact of digital learning.

Experience goal: That I can assist with digital learning.

Digital competence

Excellent — non existing

6.7 Scenarios

Based on these personas, scenarios will be created to bring the users to life during the development of the design proposal. Scenarios are stories designed to see how users might act to achieve a goal in the design. These are made to put the user's motivations, needs, and barriers into the context of the design (The Interaction Design Foundation, 2019).

In this project, three scenarios have been created, one for each persona. The scenarios will include how the persona (individual user) carries out a task or a situation through the user's desired goal for the task (Baxter et al., 2015) Through these scenarios, ideal user interactions, and interaction framework will lay a foundation for a proposal, and future design requirements will be created (Cooper et al., 2014).

1. Ellen wants to make sure that she does not create differences in her child's class by not being involved enough.

Ellen is afraid that digital learning shall create greater differences between children due to a possible lack of a digital learning environment at home, and parents' interest in digital learning and knowledge.

She will thus ensure that she does not create these inequalities in the class and that she is as involved as is needed and as she wishes.

She picks up her smartphone and finds information about the school environment. Here she goes to parental involvement in the menu and gets an article that informs about parental involvement in general, the role of parents, and digital learning among parents.

She learns, among other things, that children learn by participating and by being guided. Then she realizes that it is important that she continue with the part she does in the child's school work and guides if they are stuck.

2. Marcus want to find out what the school does to make sure his child continues to learn to write by hand.

Marcus has a child who just started first grade and is getting his own iPad. Marcus himself feels he has mastered the digital and is active on the digital learning platform that belongs to the child.

Before his child is given the iPad, he received only an informative letter about information about how the iPad works and an accompanying contract with general practical information.

Marcus thinks the iPad is a good tool, but he is worried that the child will not learn to write properly, as they have started practicing this in kindergarten. Marcus goes to the national website and finds out what actions it´s taken to reduce the worries many parents have about the use of digital tools. He navigates to digital learning tools and iPad. Here he finds information that all iPads should have accompanying apple pencils so that pupils not only use their fingers on the iPad but use the apple pencil when writing so they learn letters by hand and the right handle.

This calms him down, and he is not as nervous about the child's use of the iPad anymore, as it will not go beyond the handwriting.

3. Anne wants to know what it takes to be a good role model in the digital world for her children and what skills are needed to accomplish this.

Anne has decided to be a good digital role model for her children. She has an average good digital competence and uses both mobile and PC in her everyday life, yet she wants to get an overview and find out if there is anything she should improve.

She uses her computer to go to the website that deals with national guidelines. Further she navigates to digital school life, and then digital competence. Here she finds out what digital competence is and what it takes to have high digital competence. She also finds information on what can be done at home to create a digital learning environment.

At the bottom of the article, she finds an overview that parents should help their children find good and reliable sources. She feels that she has not been very aware of this, and reads through the presented checkpoints.

6.8 Design requirements and principles

Now that the process toward design requirements has been completed, it is time to define them. Design requirements are statements that specify which important actions the proposal should contain (Cooper et al., 2014; Rogers, et al., 2019). Based on the design methods used, the minimum design requirements for the national information will be presented below. Similar to the digitization strategy (NOU 2020: 12), the responsibility is divided between National authorities and the municipal sector. This should also apply to this case, where a national informative website is presented, while the municipalities are encouraged to do the same on their platforms to inform what specifically the school does with the relevant points. Specific suggestions can make parents less worried, and that they can get confirmation that concerns are assessed, as well as digital tools are justified at both national and municipal level.

There are national guidelines, but the school must inform about its own use. It is desired to make the reader aware that the proposed solution will not be created, but will be integrated into an already existing website. This is because it is seen as easier for parents to get information on a platform they are already familiar with. The overall national focus will be on overriding principles and information.

It was first thought that an information section for the national guidelines could be integrated into the Directorate of Education's (Udir) website. But after some research, Udir focuses on the teacher's role and tasks. Thus, it is proposed to integrate the information into the previously mentioned Parents 'Committee for Basic Education (FUG), which is a national and independent body for the Ministry of Education (Foreldreutvalget for grunnopplæringen, 2021). It is emphasized that this is only an assumption. FUG provides advice and guidance to parents on cooperation between home and school, and ensure that the parent's voice is heard in school policy matters (Foreldreutvalget for grunnopplæringen, 2021). Therefore, it is perceived that FUG is the right national area to integrate the national guidelines. However, FUG has very little on its website about digital school life, even though it is now such a big part of everyday school life. There is only one article that talks about the topic. This proposal thus becomes a further development of the existing solution, where several themes around digital school life are included. The website will also be somewhat redesigned for the purpose.

FUG's original website can be accessed here:
https://foreldreutvalgene.no/fug/

Table 10. Design requirements for national guidelines

Quality assured content.
Give parents an overview of their important role in their children's digital learning.
Inform about national actions to prevent common concerns.
Inform about the usefulness of digital learning and digital tools on a general basis.
Be easily accessible to all parents with children in primary school or who are about to start.
Information about national guidelines for training digital tools.
Informate to ensure the parents that the children learn to develop everything they need.

Although this thesis does not focus on the actions at the municipality's level as this is outside the competence of this thesis at present, possible design requirements are still laid that are encouraged for further design. The possibilities that are seen based on current knowledge are that these actions are integrated either on the municipalities 'websites or each school/class' digital learning platform. Since schools in Norway use different applications and learning platforms, and there has been no detailed insight into what the learning platforms look like on the inside, due to the lack of relevance to this task, it is uncertain how they can be integrated here. It is therefore chosen to create design requirements regardless of where they are to be integrated into the municipality.

Table 11. Suggested design requirements for municipal actions

Inform about specific concerns related to digital tools within the municipality.
Give parents knowledge about which digital tools the school uses.
Explain why the various learning tools are used in learning.
Inform about specific choices the school makes regarding digital learning.
Inform in a way that makes it easy for all parents to understand, regardless of digital competence level.
Explain in a way that shows that it is natural to have concerns about something as new as digital technology around your child, but that it is not always necessary to be so.
Interconnected and recognizable with national guidelines.

6.9 Designing the proposal

Now that scenarios have been created to imagine ideal user interactions, and further defining the design requirements, it is time do design (Cooper et al., 2014). In this thesis, interaction design principles are followed. When following these principles, the design part itself, according to Cooper et al., is divided into 3 phases (2014). The framework phase, refinement phase, and the evaluation phase. As this master's thesis provides a proposal for a solution, the first two phases will be presented, and the evaluation phase will be encouraged for further work.

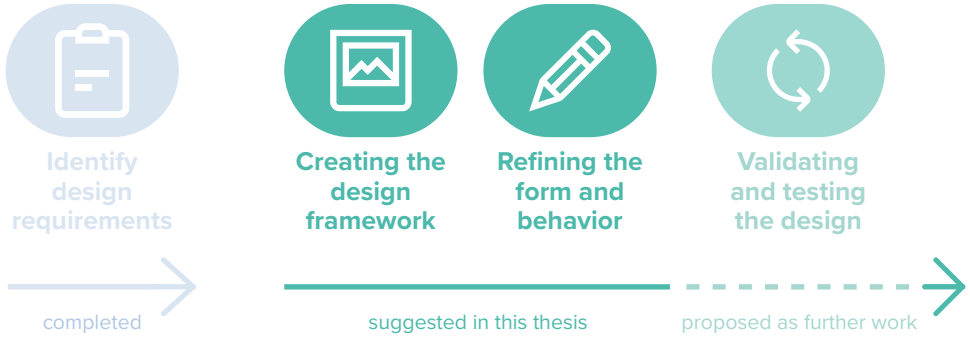


Figure 13. Designing the product: framwork and refinement (Cooper et al., 2014)

Creating the design framework

As this is a further design on the already existing website of FUG, this design builds on already existing principles. Since this is a responsive website, it will be designed two versions in this proposal. A mobile version will be designed that is shown through one scenario and a dexterous version that is shown through two scenarios.

The proposal also builds on the existing design's elements and hierarchy, which is not relevant to go into more detail in this thesis, as the information architecture itself is part of the design, but to add additional information on the already existing elements. The process thus began with starting from the existing website of FUG and drawing a paper sketch. After the sketches, the key patch scenarios were assessed, which means how the characters interact with the proposal. The interactions are presented in the view of the proposal.

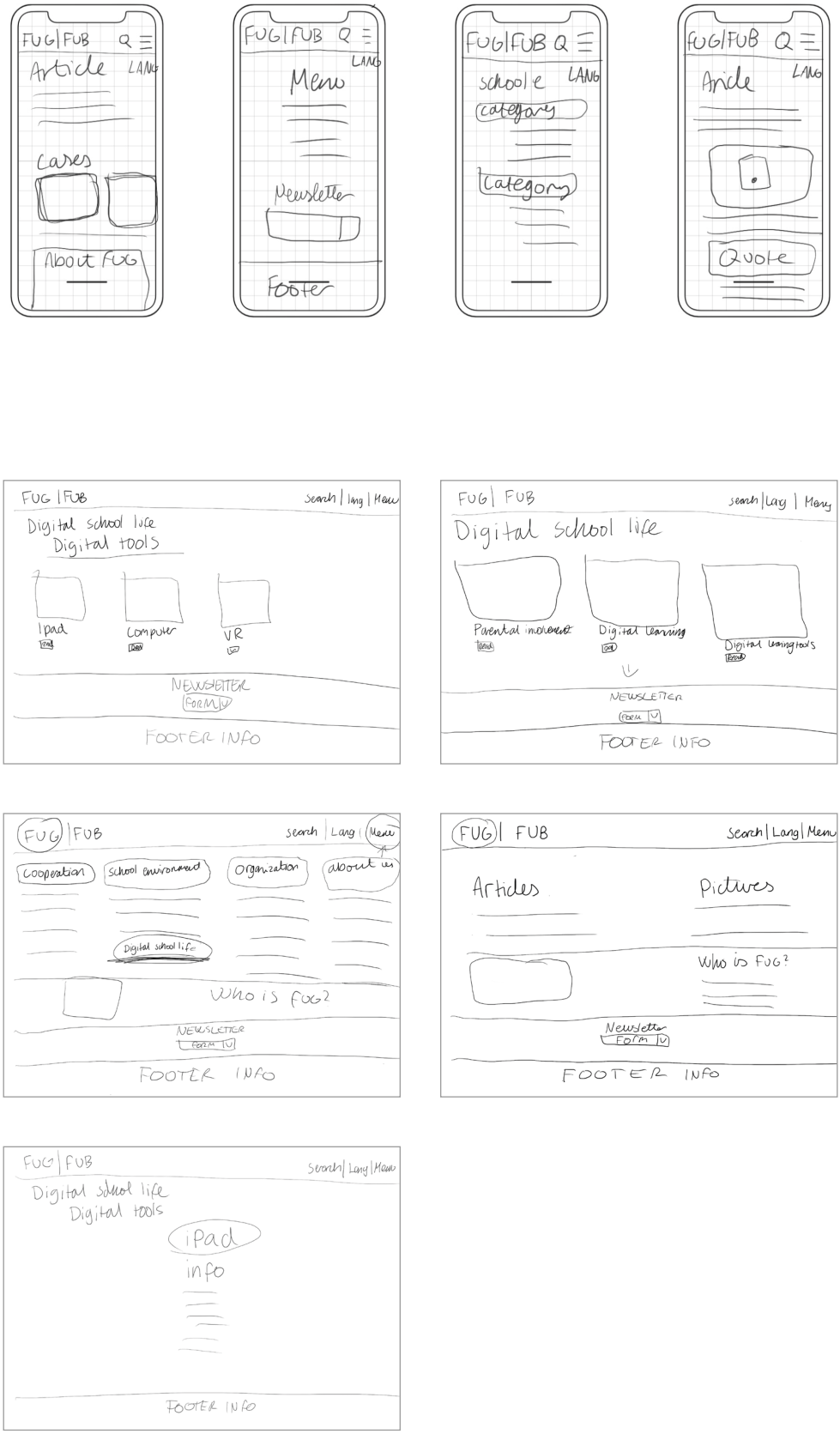


Figure 14. Framework sketches

Refining the form and behavior

In this phase, the design is presented trough a concrete form and the sketches are translated into prototypes. In the design proposal the pictures are from pexels.com and the icons are from svgrepo.com. On the next page, the proposal will be presented through the scenarios, and how it can be solved, for example, on FUG's website to provide parents with information about their children's digital school life and the parents' important

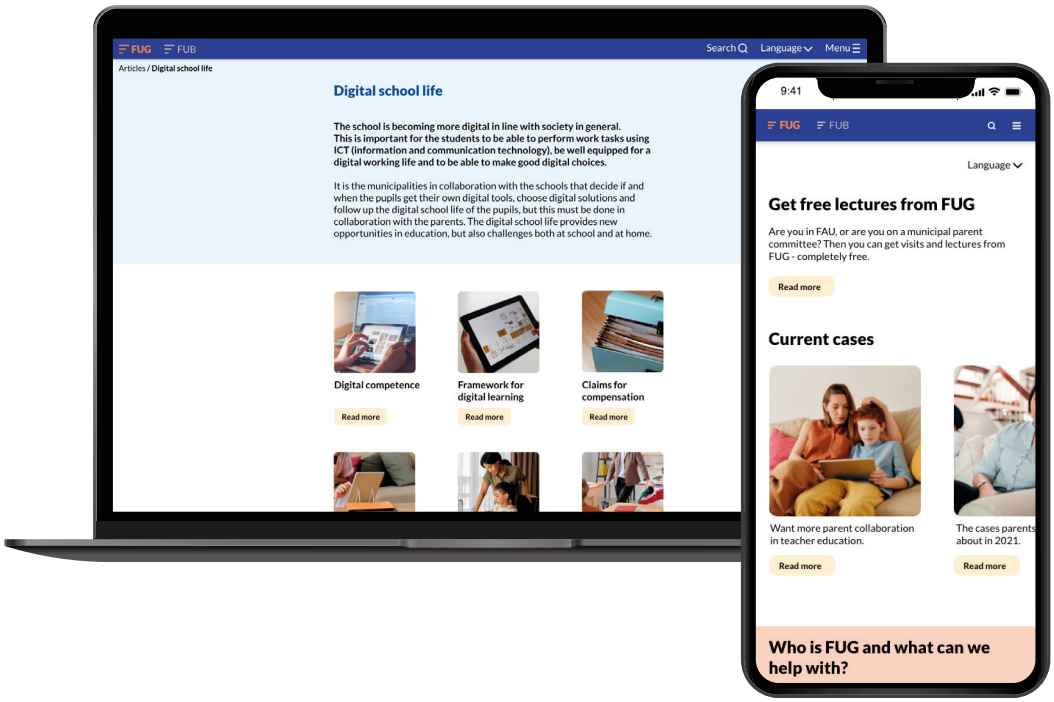
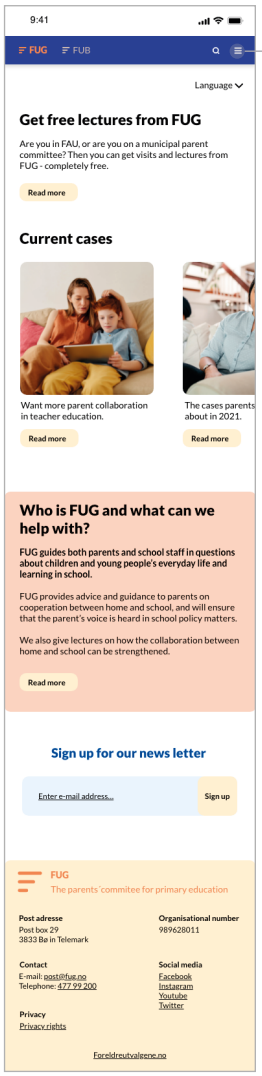


Figure 15. Illustration of the proposal, desktop and mobile version

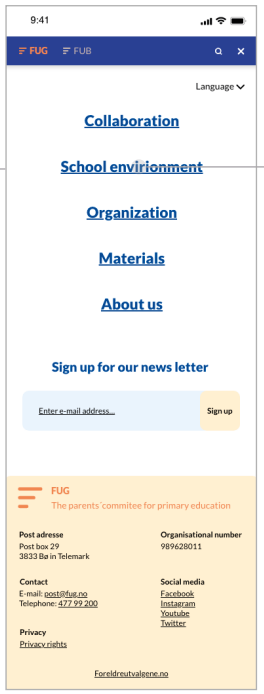
Scenario 1: Parental involvement

Slide trough cases

Scroll



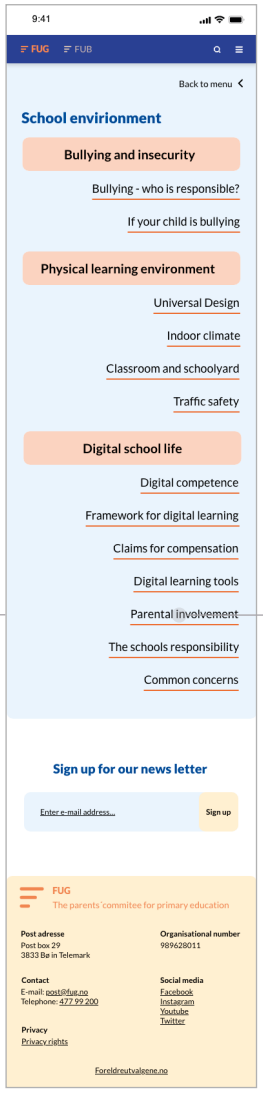
Home page.
Ellen touch the hamburger menu icon to navigate to menu.



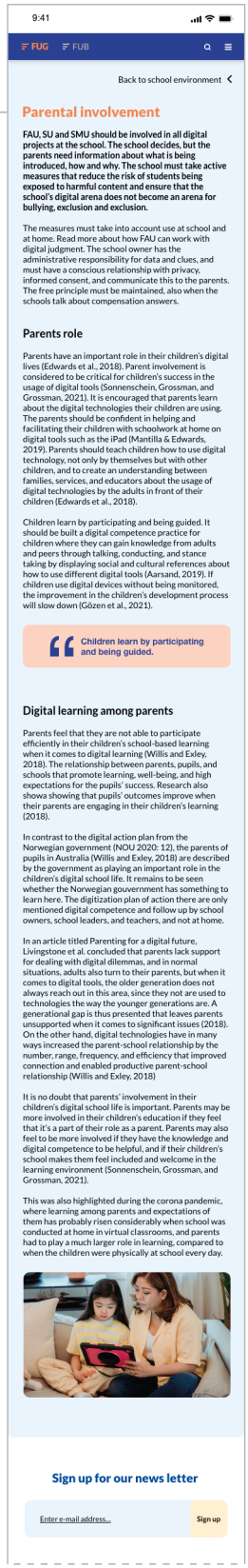
Menu page.
After navigating to menu, Ellen further choses school environment.

Link to prototype:

https://xd.adobe.com/view/b31a090c-49dd-4a4b-99fc-32bad17a3b29-e649/?fullscreen



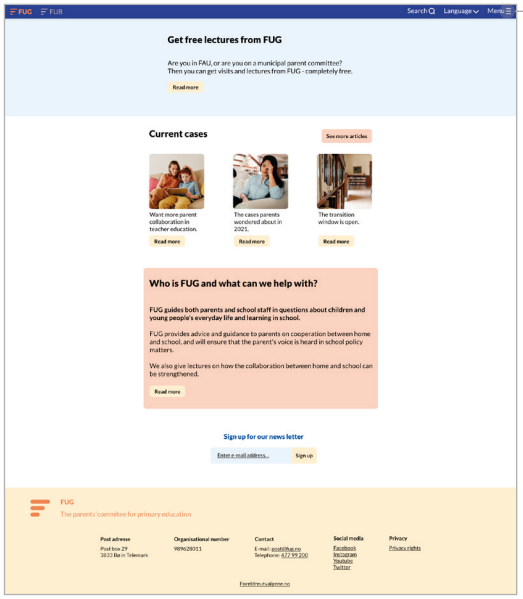
School environment page. In the navigation of school environment, Ellen scroll down to parental involvement and touch it.



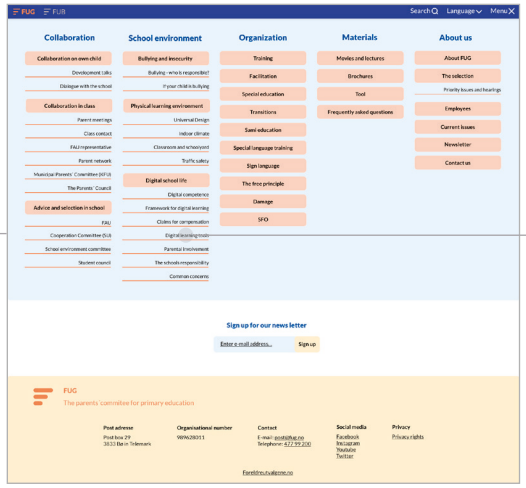
Scroll

Parental involvement page. Ellens scrolls and read wished information.

Scenario 2: Concerns regarding iPad



Home page.
Marcus clicks on the hamburger menu icon to navigate to menu.

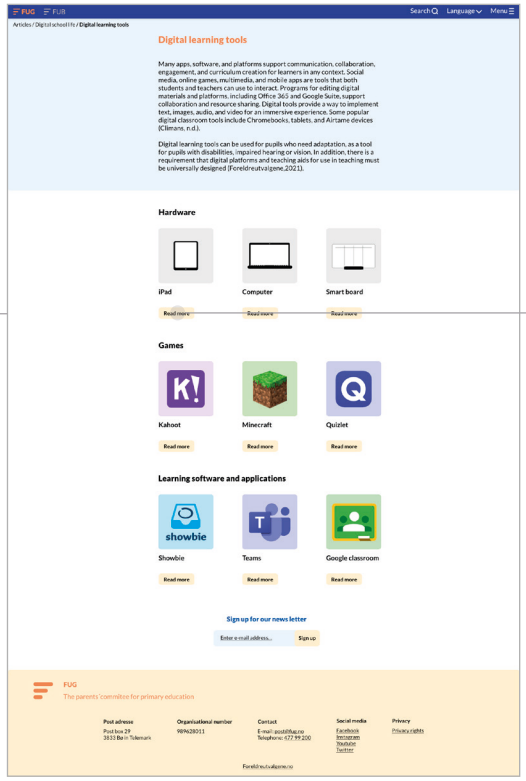


Menu page.
After navigating to menu, Marcus further choses digital learning tools.

Link to prototype:

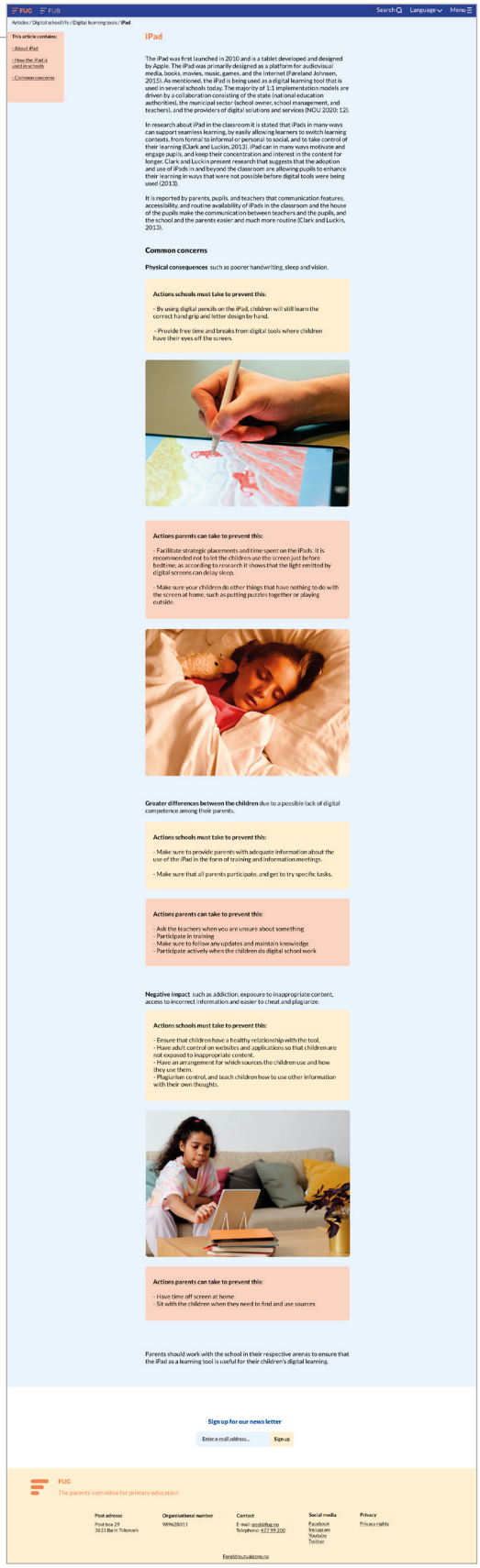
https://xd.adobe.com/view/ce5c8635-d538-42c5-8e94-6460a5ee5216-9b0f/?fullscreen

Alternative navigation, as well as showing where the user is on the page.



Digital learning tools page page.
Marcus clicks on the hardware iPad.

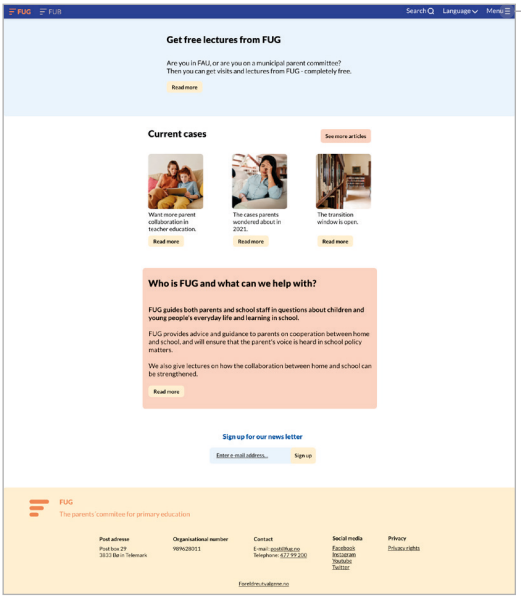
Scroll



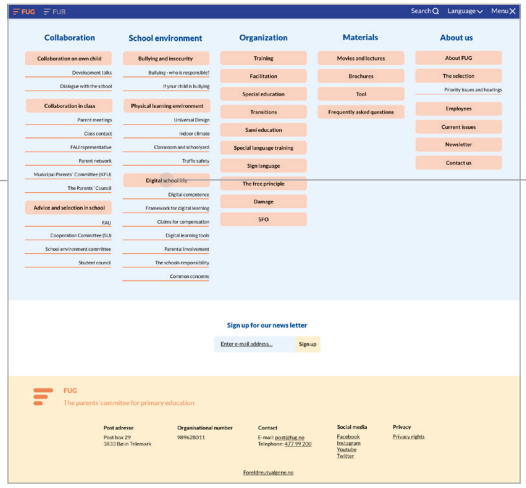
iPad page.
After clicking on iPad, Marcus can read trough and get the informati-on and confirmation he wants.

Scenario 3: Digital competence

Anne can either click directly at digital competence or go trough digital school life, as she choses.



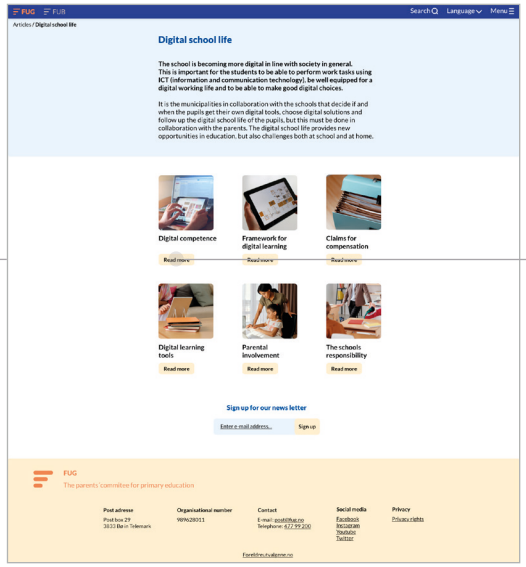
Home page.
Anne clicks on the hamburger menu icon to navigate to menu.



Menu page.
After navigating to menu, Anne clicks on digital school life.

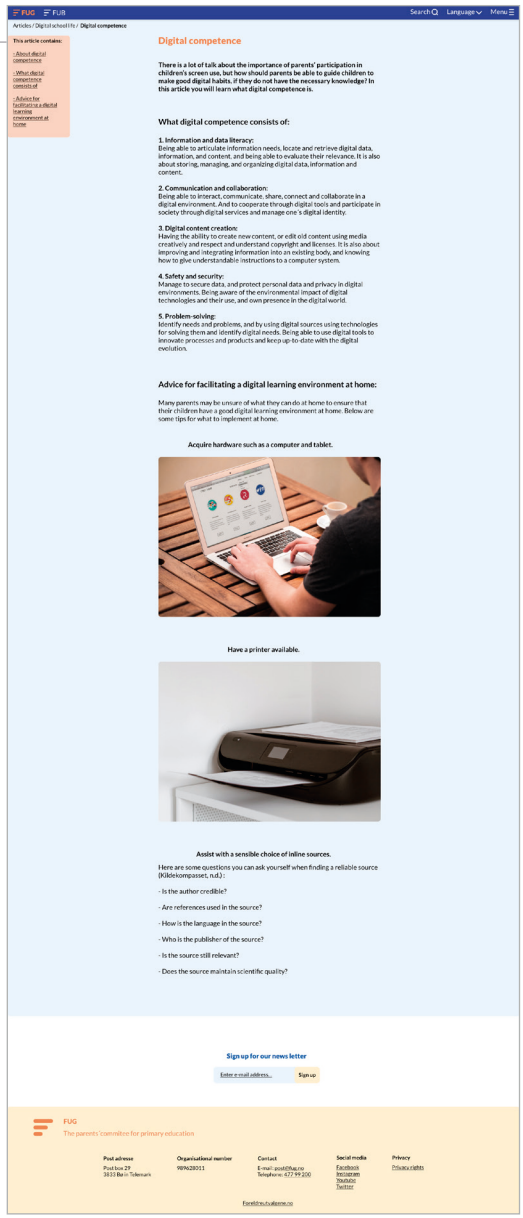
Link to prototype:

https://xd.adobe.com/view/d8c74425-0e96-4260-99ca-274a04a2850d-8d94/?fullscreen



Digital school life menu.
Further Anne clicks on digital competence.

Scroll



Digital competence page.
Anne can now read trough and get the knowledge she wants on the theme.

Validating and testing the design

In this thesis, the focus has been on the parents' role, so it is important to keep in mind that this is only a suggestion and that before this is used, those who have knowledge of the topic must verify the claims. This is only intended as an example and a suggestion for a potential solution to what was found in the insight in this master's thesis.

When carrying out an interaction design project, it is relevant to evaluate whether the design meets the actual user's needs. Validating and testing the design should be done when the design is detailed enough to give the user something concrete to answer. User feedback is a good way to identify positive and negative aspects of the interaction design framework. Usually, in a design situation, it would be natural to usability test, which means that the user is asked to complete given tasks on the design. In this case where there is an already public website designed and developed by someone who has already conducted such tests, and as this is only a further design of the existing solution, it is rather encouraged to conduct focus groups with users to find out if this solution is something that can lessen worries.

This proposal is based on the perception that parents are concerned about their children's use of digital learning tools because many have not received information or training on why and how digital tools are used.

It is therefore encouraged that greater focus is placed on the inclusion and information of the parents about the children's digital learning, through, for example, such a solution as is presented in this assignment.

Furthermore, the municipalities are encouraged to enter specific details for their school and inform the parents which digital learning tools they use, what they use it for, why they use it, and what concerns the parents have related to the various municipalities and the school, and answer these through communication and information sharing through the school platform as this is very individual.

6.10 The designer´s reflection

In closing, this assignment could have had the potential to practice user-centered and participatory design, but this was not given priority. The thesis, therefore, wishes to encourage testing, assessment, and further development of the forthcoming proposal this thesis has arrived at.

In the introduction, it was stated that technology has come to stay and that if designers focus on utilizing it in the best possible way, great and important advances can be achieved. It was also presented that the right design for the selected target group can have a great positive impact on life. Initially, it was mentioned that something that engaged the task was the skepticism new technology encounters, and how important it is to understand the usefulness of the technology.

As a designer, it is relevant to ask questions about the effect of what is created, and how many are affected by what is created. In design, there are several different ways to look at the user. There are concepts such as design thinking, service design, ethical design, and user-centered design. Several of these design concepts overlap and have fluid transitions. This thesis did not go further into the differences in the design proposal due lack of relevance, but have used interaction design principles as a common thread in the presented proposal.

Conclusion

7.1 Summary of answer to the problem statement

7.2 Evaluation of process

7.3 Future research

7. Conclusion

The conclusion is based on findings and analysis to answer the research questions asked, a design of which was then proposed. The conclusion summarizes the problem statement, as well as the possibilities this thesis creates, and what can be done based on this thesis in further research.

7.1 Summary of answer to problem statement

In the introduction, it was stated that parents are a group that is often forgotten in the school context, even though they have an incredibly important role in the children's learning, and also the children's digital learning. The master's thesis thus wanted to be based on the parent's perspective on the children's digital school life. The target group, therefore, became parents of young school children in primary school. The project wanted to find out what the parents' role was in the children's digital learning from a domestication perspective.

Parents have an important role in children's digital learning. Parents have many roles, as parents have attitudes, concerns, and motivations. They are also involved in the children's digital school life. Parents should facilitate a digital learning environment at home so that children can develop their digital skills at home. Parents should also have a high level of digital competence to be able to assist their children in digital learning at home. Although the roles of parents are many and important, there is still a need for them to be seen and heard. In this master's thesis, it was stated that concerns are where the shoe presses for the parent's involvement in the children's everyday school life and that this is something that should be focused on more. Not all teachers are aware of their parents' concerns, and they should be taken seriously and informed about digitalization in schools.

After the insight was gained, a design proposal was presented with a further problem of how to take parents' concerns regarding digital learning seriously, and show how these can be taken into account, as well as the school does facilitate to reduce them. The proposal for the problem was that digital school life should be put even more focus by FUG, which will ensure that the parent's voice is heard in school political matters. The solution was thus presented through scenarios on how parents can be informed about important, desired, and detailed information about both concerns, and advice and about the digital learning tools in school.

7.2 Evaluation of process

In order to evaluate the study, it has subsequently been seen that it has been useful to conduct interviews with parents as well. However, this could quickly lead to dishonesty which is described in more detail in the research quality section, or that it was only the extremes of the parents, ie the very positive or very negative ones who wanted to participate. There has also been a challenge in the discussion part and distinguishing between the teachers' and parents' roles, in that it is difficult to discuss the parents' impact on the children's everyday school life without involving the people who are teaching the students throughout the school day, namely the teachers. This has been a thesis that was based on examining the parents' roles but took a turn based on the insight into what the assignment should suggest. This has thus been a task that did not have a goal of what it should result in solution proposals at the beginning, but those thoughts were formed along the way based on insight work.

7.3 Future research

Opportunities this master's thesis brings with it are a proposal to putting parents' concerns back on the agenda. It is encouraged that national authorities put more focus on the important role of parents, and make sure to provide enough information about the digital school life in primary school. An opportunity is now opened to form principles that all the country's schools follow when it comes to learning in schools through digital tools so that all schools will have an equally good starting point. Furthermore, the municipalities are encouraged to build on the national guidelines and inform and include the parents with the introduction, justification, and clarification of concerns of the chosen digital tools in the schools.

The result of this study brings with it many opportunities for further research. There is a lot of exciting research that could have been done further regarding the parenting role in primary school. It would have been relevant for further research to compare parents with children in the districts, together with the pilot schools in the large and central cities. It would also have been exciting to seek out parents who have been skeptical, and who still are, or skeptical parents, but now are not, and what the reasons are. After any integration of what was presented in opportunities, it would be exciting to see if it made any changes to the parent's concerns and if they were reduced.

Bibliography

Aftenbladet.no. (2020). *Ville bytte skole da sønnen kom hjem med Ipad. Så tok hun egne grep.* [online] Available at: https://www.aftenbladet.no/innenriks/i/X8oAjm/ville-bytte-skole-da-soennen-kom-hjem-med-ipad-saa-tok-hun-egne-grep [Accessed 23 May 2022].

Aftenbladet.no. (2019). *Nettbrettene inntar norske klasserom. Ingen vet om barna lærer mer eller mindre med dem.* [online] Available at: https://www.aftenbladet.no/magasin/i/0nXV6g/nettbrettene-rykker-inn-i-klasserommet-ingen-vet-helt-hva-det-gjoer-med-laeringen [Accessed 23 May 2022].

Andreassen, T.W. (2019). *Lærer barna mer når skoler innfører Ipad? Nei!* [online] aftenposten.no. Available at: https://www.aftenposten.no/meninger/debatt/i/MRpPGr/laerer-barna-mer-naar-skoler-innfoerer-ipad-nei-tor-w-andreassen [Accessed 23 May 2022].

Baxter, K., Courage, C. & Caine, K. (2015) *Understanding Your User: A Practical Guide to User Research Methods.* 2nd edition. USA: Elsevier.

Bedrekommune. (n.d.). *Hvordan trekke et representativt utvalg?* [online] Available at: https://www.bedrekommune.no/artikkel/hvordan-trekke-et-representativt-utvalg [Accessed 2 May. 2022].

Bhandari, P (2021) *A guide to ethical considerations in research.* Available at: https://www.scribbr.com/methodology/research-ethics/ [Accessed 1 Dec. 2021]

Bober, M., Hynes, D. (2018). *Tools for Entertainment or Learning? Exploring Students' and Tutors' Domestication of Mobile Devices.* In: Bonderup Dohn, N., Cranmer, S., Sime, JA., de Laat, M., Ryberg, T. (eds) Networked Learning. Research in Networked Learning. Springer, Cham. https://doi.org/10.1007/978-3-319-74857-3_9

Chaudron S., Di Gioia R., Gemo M. (2018) *Young children (0-8) and digital technology, a qualitative study across Europe;* EUR 29070; doi:10.2760/294383

Clark, W. and Luckin, R. (2013). *What the research says iPads in the Classroom.* [online] Available at: https://digitalteachingandlearning.files.wordpress.com/2013/03/ipads-in-the-classroom-report-lkl.pdf. London Knowledge Lab. [Accessed 29 Mar. 2022].

Climans, D. (n.d.). Digital Technology Tools for the Classroom. [online] www.risevision.com. Available at: https://www.risevision.com/blog/digital-technology-tools-for-the-classroom [Accessed 26 May 2022].

Cooper, A., Reimann, R., Cronin, D. and Noessel, C. (2014). *About face: the essentials of interaction design.* 4th ed. Indianapolis, Indiana.: John Wiley And Sons, inc.

Creswell, John W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 4th ed., Thousand Oaks, California, Sage Publications, Inc, 2014.

Dalheim, J. (2020). *Ja til blyant og papir i skolen - nei til mer skjerm!* [online] sa.no. Available at: https://www.sa.no/ja-til-blyant-og-papir-i-skolen-nei-til-mer-skjerm/o/5-46-964333 [Accessed 23 May 2022].

Dardanou, M., Unstad, T., Brito, R., Dias, P., Fotakopoulou, O., Sakata, Y., and O'Connor, J. (2020). *Use of touchscreen technology by 0–3-year-old children: Parents' practices and perspectives in Norway, Portugal, and Japan.* Journal of Early Childhood Literacy, 20(3), pp.551–573.

DeCoster, J., Iselin, A.-M. R., & Gallucci, M. (2009). *A conceptual and empirical examination of justifications for dichotomization*. Psychological Methods, 14(4), 349-366. http://dx.doi.org/10.1037/a0016956

Dvergsdal, H. (2021). *digitalisering.* [online] Store norske leksikon. Available at: https://snl.no/digitalisering.

Edwards, S., Straker, J & Oakey, H (2018) *Statement on young children and digital technologies. Early Childhood Australia (ECA).* Canberra, ACT: ECA. http://dx.doi.org/10.23965/ECA.001

European Commission. (n.d.). *The Digital Competence Framework 2.0.* [online] Available at: https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework-20_en [Accessed 28 Mar. 2022].

Fjørtoft, S.O. (2020). *Nær og fjern: Læreres erfaringer med digital hjemmeskole våren 2020.* [online] SINTEF Digital avd. Teknologiledelse. Available at: https://sintef.brage.unit.no/sintef-xmlui/bitstream/handle/11250/2676094/Fj%25C3%25B8rtoft%2b-%2bN%25C3%25A6r%2bog%2bfjern%2b-%2btil%2bpublisering.pdf?sequence=2&isAllowed=y [Accessed 29 Mar. 2022].

Foreldreutvalget for grunnopplæringen. (2021). *Digital skolehverdag.* [online] Available at: https://foreldreutvalgene.no/fug/digital-skolehverdag/ [Accessed 23 May 2022].

Forkosh Baruch, A. and Erstad, O. (2018). *Upbringing in a Digital World: Opportunities and Possibilities.* Technology, Knowledge, and Learning. [online] 23(3). Available at: https://link.springer.com/article/10.1007%2Fs10758-018-9386-8 [Accessed 23 Mar. 2022].

Forskrift til opplæringslova (2006) *Forskrift til lov om grunnskolen og den vidaregåande opplæringa (opplæringslova).* Available at: https://lovdata.no/dokument/SF/forskrift/2006-06-23-724/KAPITTEL_24#KAPITTEL_24 [Accessed 02 Mai. 2022].

Føreland Johnsen, H. (2015). *Nybegynner på iPad? - Telenor.* [online] www.online.no. Available at: https://www.online.no/apple/abc-til-ipad.jsp [Accessed 29 Mar. 2022].

Brochmann, G (2020). *De digitale prøvekaninene: historien om hvorfor barnet mitt plutselig kom hjem med en iPad i skolesekken.* Oslo: Cappelen Damm.

Gözen, G., Karakaş, N., Şahin, C., Özpoyraz, E., Altunbdal, M. and Acar, I.H. (2021). *Learning through digital tools in early childhood.* [online] Child Development and Learning Studies Lab, Özyeğin University. Available at: https://labs.ozyegin.edu.tr/cdll/files/2021/04/en_childlearningviatechnology.pdf [Accessed 29 Mar. 2022].

Haddon, L. (in press) *'Domestication and the Media,'* in Rössler, P. (Ed.) The International Encyclopedia of Media Effects, Wiley-Blackwell, New Jersey

Haddon, L. (2018) *'Domestication and social constraints on ICT use: Children's engagement with smartphones',* in Vincent, J. and Haddon, L. (eds) Smartphone Cultures, Routledge, Abingdon, p.71-82

Haddon, L. and Vincent, J. (eds.) (2014). *European children and their carers' understanding of use, risks, and safety issues relating to convergent mobile media.* Report D4.1. Milano: Unicatt

Hosokawa, R. and Katsura, T. (2018). *Association between mobile technology use and child adjustment in early elementary school age.* [online] 13(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0199959.

IDEO (2015) *The Little Book of Design Research Ethics.* 1st Edn.

IGI Global. (n.d.). *What is Digital Learning Tools*. [online] Available at: https://www.igi-global.com/dictionary/digital-learning-tools/75538 [Accessed 31 May 2022].

Indeed Editorial Team (2021). *What Is the Iterative Process? (Definition and Steps)*. [online] Indeed Career Guide. Available at: https://www.indeed.com/career-advice/career-development/iterative-process [Accessed 29 May 2022].

Jensen, M., George, M.J., Russel, M.R., & Odgers, C.L (2019). *Young Adolescents' Digital Technology Use and Mental Health Symptoms: Little Evidence of Longitudinal or Daily Linkages.* Clinical Psychological Science, 7(6), pp. 1416–1433 DOI: 10.1177/2167702619859336

Jernes, M., Alvestad, M. and Sinnerud, M. (2010). *"Er det bra, eller?" Pedagogiske spenningsfelt i møte med digitale verktøy i norske barnehager.* Nordisk Barnehageforskning 2010, 3(3).

Kildekompasset. (n.d.). *Kildekritikk.* [online] Available at: https://kildekompasset.no/kildekritikk/ [Accessed 27 May 2022].

Kmecová, I. (2019). *Digitization, Digital Technology, and Importance of Digital Technology in Teaching.* Lecture Notes in Networks and Systems, (84), pp.526–537.

Kommunal- og moderniseringsdepartementet (2014). *Digitalisering i offentlig sektor.* [online] Regjeringen.no. Available at: https://www.regjeringen.no/no/tema/statlig-forvaltning/ikt-politikk/digitaliseringen-i-offentlig-sektor/id2340245/ [Accessed 17 Mar. 2022].

Korneliussen, R. (2020). *Slår nettbrett-alarm.* [online] dagbladet.no. Available at: https://www.dagbladet.no/kultur/slar-nettbrett-alarm/72803306 [Accessed 23 May 2022].

Kvittingen, I. (2020). *Får barn dårligere sosiale evner av mye skjermtid?* [online] forskning.no. Available at: https://forskning.no/barn-og-ungdom-sosiale-relasjoner-teknologi/far-barn-darligere-sosiale-evner-av-mye-skjermtid/1672615 [Accessed 23 May 2022].

Leedy, P.D. and Ormrod, J.E. (2016). *Practical Research: Planning and Design.* Harlow, Essex: Pearson Education.

Lindeman, S., Svensson, M. and Enochsson, A.-B. (2021). *Digitalization in early childhood education: a domestication theoretical perspective on teachers' experiences.* Education and Information Technologies, 4879–4903(26).

Livari, N (2020) *Empowering children to make and shape our digital futures – from adults creating technologies to children transforming cultures.* The International Journal of Information and Learning Technology, 37 (5), pp. 279-293 DOI: 10.1108/IJILT-03-2020-0023

Livingstone, S., Blum-Ross, A., Pavlick, J. and Ólafsson, K. (2018). *In the digital home, how do parents support their children and who supports them?* [online] Parenting for a Digital Future: Survey Report 1. Department of Media and Communications, The London School of Economics and Political Science, London, UK. Available at: http://eprints.lse.ac.uk/87952/1/Livingstone_Parenting%20Digital%20Survey%20Report%201_Published.pdf [Accessed 29 Mar. 2022].

Mantilla, A. & Edwards, S. (2019) *Digital technology use by and with young children: A systematic review for the Statement on Young Children and Digital Technologies.* Australian Journal of Early Childhood, 44(2), pp. 182–195 DOI: 10.1177/1836939119832744journals.sagepub.com/home/aec

Medietilsynet (2020). *Foreldre og medier 2020: En kartlegging av foreldres erfaringer med 1–17-åringers digitale medievaner.* Medietilsynet.

Meisingset, S.L. (2022). *Vil ha debatt om Ipad i skolen.* [online] rbnett.no. Available at: https://www.rbnett.no/nyheter/i/7dMlnv/vil-ha-debatt-om-ipad-i-skolen [Accessed 23 May 2022].

Mitchell, Jonathan I., et al. (2012) *The Role of Perceived Organizational Support, Distributive Justice and Motivation in Reactions to New Information Technology.* Computers in Human Behavior, vol. 28, no. 2, pp. 729–738, DOI: 10.1016/j.chb.2011.11.021.

Morley, D, Silverstone, R (1990) *Domestic communication – technologies and meanings.* Media, Culture & Society 12(1): 31–55.

NOU 2017:8. *Framtid, fornyelse og digitalisering.* Digitaliseringsstrategi for grunnopplæringen 2017–2021. Oslo, Kunnskapsdepartementet. Available at: https://www.regjeringen.no/contentassets/dc02a65c18a7464db394766247e5f5fc/kd_framtid_fornyelse_digitalisering_nett.pdf [Accessed 02 Oct. 2021]

NOU 2020:12. *Handlingsplan for digitalisering i grunnopplæringen (2020-2021).* Oslo, Kunnskapsdepartementet. Available at: https://www.regjeringen.no/contentassets/44b8b3234a124bb28f0a5a22e2ac197a/handlingsplan-for-digitalisering-i-grunnopplaringen-2020-2021.pdf [Accessed 03 Oct. 2021]

NSD. *"Barnehage- Og Skoleforskning."* NSD, www.nsd.no/personverntjenester/oppslagsverk-for-personvern-i-forskning/barnehage-og-skoleforskning/.

NSD. *"Fylle Ut Meldeskjema for Personopplysninger."* NSD, www.nsd.no/personverntjenester/fylle-ut-meldeskjema-for-personopplysninger/.

Plowman, L., Stephen, C. and McPake, J. (2010). *Up with Technology: Young children learning in a digital world.* Routledge, London. ISBN: 978-0-415-46892-3

Preece, J., Sharp, H., and Rogers, Y. (2015) *Interaction design: beyond human-computer interaction.* 4th ed. Chichester: Wiley.

Raja, R. and Nagasubramani, P.C. (2018). *Impact of modern technology in education.* Tamil Nadu, India: Phoenix Research.

Rama Murthy, S. and Mani, M. (2013). *Discerning Rejection of Technology.* SAGE Open, [online] 3(2). Available at: https://journals.sagepub.com/doi/10.1177/2158244013485248 [Accessed 28 Mar. 2022].

Rogers, Y., Sharp, H and Preece, J. (2019). *Interaction design: Beyond human computer interaction*, 5th edition. Indianapolis, IN: Wiley

Rosala, M. (2021). *Using 'How Might We' Questions to Ideate on the Right Problems.* [online] Nielsen Norman Group. Available at: https://www.nngroup.com/articles/how-might-we-questions/ [Accessed 25 May 2022].

Rosland, K. (2019). *Digitale salgs- og presentasjonsverktøy.* [online] ndla.no. Available at: https://ndla.no/nb/subject:1:382e6cf8-0c78-4f78-b96a-2927cfef632a/topic:2:193368/resource:1:106399 [Accessed 29 May 2022].

Sandberg, H., Sjöberg, U., & Sundin, E. (2021). *Toddlers' digital media practices and everyday parental struggles: Interactions and meaning-making as digital media are domesticated.* Nordicom Review, 42(S4), 59–78. https://doi.org/10.2478/nor-2021-0041

Selwyn, N. (2013). *EDUCATION IN A DIGITAL WORLD: Global Perspectives on Technology and Education.* Oxon OX14: Routledge.

Silverstone, R (1994) *Television and Everyday Life.* London: Routledge.

Silverstone, Roger, Hirsch, Eric (Eds.) (1992). *Consuming Technologies: Media and information in domestic spaces.* London/New York: Routledge

Siu-Cheung Kong (2018) *Parents' perceptions of e-learning in school education: implications for the partnership between schools and parents, Technology, Pedagogy and Education.* 27:1, 15-31, DOI: 10.1080/1475939X.2017.1317659

Sonnenschein, S., Grossman, E.R. and Grossman, J.A. (2021). U.S. Parents' Reports of Assisting Their Children with Distance Learning during COVID-19. *The Role of Technology in Teaching, Learning, and Assessment during and Post-COVID-19: Opportunities for Innovation and Challenges.* [online] 11(9). Available at: https://www.mdpi.com/2227-7102/11/9/501/htm [Accessed 24 Mar. 2022].

Stickdorn, M. Horness, M. Lawrence, A. and Schneider, J. (2018) *This is service design doing: expanded service design thinking methods for real projects.* 1st eds. Sebastopol: O´Reilly Media, Inc. Tomitsch, M., Wrigley, C., Borthwick, M., Ahmadpour, N., Frawley, J., Kocaballi, A., . . . Loke, L. (2019). A Handbook of Methods. Amsterdam: BIS Publishers

Store norske leksikon. (2020). *IKT.* [online] Available at: https://snl.no/IKT [Accessed 29 May 2022].

Store norske leksikon. (2021). *nettbasert opplæring*. [online] Available at: https://snl.no/nettbasert_oppl%C3%A6ring [Accessed 30 May 2022].

Straker, L., Zabatiero, J., Danby, S., Thorpe, K. and Edwards, S. (2018). *Conflicting Guidelines on Young Children's Screen Time and Use of Digital Technology Create Policy and Practice Dilemmas.* The Journal of Pediatrics, 202, pp.300–303.

Sun, Shaojing. (2008) *"An Examination of Disposition, Motivation, and Involvement in the New Technology Context Computers in Human Behavior."* Computers in Human Behavior, vol. 24, no. 6, pp. 2723–2740, DOI: 10.1016/j.chb.2008.03.016.

Taylor, Ian M., et al. (2019) *"Integrating Theories of Self-Control and Motivation to Advance Endurance Performance".* International Review of Sport and Exercise Psychology, vol 13, no. 1, 1-20, DOI: 10.1080/1750984x.2018.1480050.

The Interaction Design Foundation. (2019). *What are User Scenarios?* [online] Available at: https://www.interaction-design.org/literature/topics/user-scenarios.

Tjernshaugen, A., Hiis, H., Bernt, J.F., Braut, G.S. and Bahus, V.B. (2022). *koronapandemien.* [online] Store norske leksikon. Available at: https://sml.snl.no/koronapandemien [Accessed 29 May 2022].

Udir (n.d.a). *Den digitale tilstanden i Skole-Norge.* [online] Available at: https://www.udir.no/tall-og-forskning/publikasjoner/utdanningsspeilet/utdanningsspeilet-2021/digital-tilstand/ [Accessed 29 Mar. 2022].

Udir (n.d.b). *Digitale ferdigheter som grunnleggende ferdighet.* [online] Available at: https://www.udir.no/laring-og-trivsel/rammeverk/rammeverk-for-grunnleggende-ferdigheter/2.1-digitale-ferdigheter/# [Accessed 28 Mar. 2022].

Udir (n.d.c). Foreldrerepresentanter i skolen. [online] Available at: https://www.udir.no/kvalitet-og-kompetanse/samarbeid/samarbeid-mellom-hjem-og-skole/foreldrerepresentanter/ [Accessed 23 May 2022].

Udir (n.d.d). *Hva er hjem-skole-samarbeid?* [online] Available at: https://www.udir.no/kvalitet-og-kompetanse/samarbeid/samarbeid-mellom-hjem-og-skole/samarbeidet-mellom-hjem-og-skole/hva-er-skolehjem-samarbeid/ [Accessed 2 May. 2022].

Udir (n.d.e). *Om Udir.* [online] Available at: https://www.udir.no/om-udir/ [Accessed 29 May 2022].

UIO (2020). *Domestiseringsteori.* [online] Available at: http://data.ub.uio.no/skosmos/humord/nb/page/c28529 [Accessed 31 Mar. 2022].

UNICEF (2017). *Children in a Digital World. New York: United Nations Children's Fund* (UNICEF). Utdanning.no. (n.d.). Grunnskole. [online] Available at: https://utdanning.no/tema/nyttig_informasjon/grunnskole [Accessed 2 May 2022].

Victoria State Government (2019). *Teach with digital technologies.* [online] Vic.gov.au. Available at: https://www.education.vic.gov.au/school/teachers/teachingresources/digital/Pages/teach.aspx.

Vinneng, R. (2019a). *'Nei, barna trenger ikke iPad'.* [online] Dagsavisen.no. Available at: https://www.dagsavisen.no/debatt/2019/01/30/nei-barna-trenger-ikke-ipad/.

Vinneng, R. (2019b). *Nå er foreldre plutselig bekymret.* [online] dagbladet.no. Available at: https://www.dagbladet.no/kultur/na-er-foreldre-plutselig-bekymret/71634417 [Accessed 23 May 2022].

Willis, L.D. and Exley, B. (2018). *Using an online social media space to engage parents in student learning in the early years: Enablers and impediments.* Digital Education Review, [online] 0(33), pp.87–104. Available at: https://revistes.ub.edu/index.php/der/article/view/21702 [Accessed 25 Mar. 2021].

Østbye, Helge, et al. *Metodebok for Mediefag.* Bergen, Fagbokforlaget, 2013.

Appendices

A1. Consent form interview
A2. Interview guide
A3. Consent form digital questionnaire
A4. Questionnaire guide
A5. Example of iPad contract

Appendix 1: Consent form Interview

Do you want to participate in the research project:
The role of parents in children´s digital learning at home: a domestication theory perspective

Purpose
The experiment is performed in the course MIXD490 Master's thesis in Interaction Design at the Department of Design, NTNU in Gjøvik. The master's thesis is supervised by Emil Bakke, Associate Professor, Department of Design, Faculty of Architecture and Design, Norwegian University of Science and Technology.

When the government's digital action plan was introduced in primary school, there was a lot of skepticism about the topic among parents in articles and debates. Since then, there has also been a lot of use of the iPad in several primary schools, and digital tools that allow parents to follow what their children do at work at school digitally. The purpose of the project is to investigate whether skepticism about the iPad in primary school still exists today among parents and how by including parents in the children's digital learning, one can create a better understanding of how the iPad can in many cases improve children's learning and communication with parents through learning. As a designer, I, therefore, want to design a process where parents become more involved. It can be a systematic graphic presentation or a business trip, it depends on the insight I get, and what it is commitment and motivation for.

Research questions:
RQ 1: What are the parents' concerns when it comes to the child's use of the iPad?
RQ 2: What are parents' perceptions of digital learning?
RQ 3: How do parents get involved in their child's digital school work?
RQ 4: Do parents have enough basic digital skills to be able to assist their child in digital school work at home?
RQ 5: How do parents appropriate technology at home?
RQ 6: How is the iPad used as a digital learning tool in Norwegian primary schools?
RQ 7: To what degree are the parents motivated to take part in their children's learning on digital platforms?

Who is responsible for the research project?
Department of Design, Norwegian University of Science and Technology.

Why are you asked to participate?
You are asked to participate because you are:
- Employed at primary school
- Parent with children in primary school

What does it mean for you to participate?
If you choose to participate in an interview for the project, you can either participate physically or via a digital interview on Zoom or Microsoft teams. The interview aims to gather insight into which digital tools are used today and the parents' attitudes and competence.

The interview will last for about 30 minutes.

If you can not apply for an interview, but want to participate in the project, you can get in touch and be assigned a questionnaire with the interview guide which you can answer via email.

Voluntary participation
Participation in the study is voluntary, and you can withdraw your consent at any time without giving any reason. If you withdraw, all information about you will be deleted from the study. It will not have any negative consequences for you if you do not want to participate or after participation want to withdraw.

Your privacy
The information about you will be treated confidentially and by the privacy regulations. Only the project group (student and supervisor) will have access to your contact information, and this information will be replaced with a code that is stored on a separate name list separate from other data. The data collection will be stored on the student's SharePoint page at NTNU (OneDrive) which is protected with two-factor authentication through Feide.

Who has access:
Department: Department of Design, Faculty of Architecture and Design,
Norwegian University of Science and Technology.

Student: Mina Nordby, student, master in interaction design, Department of
design, Norwegian University of Science and Technology.

Supervisor: Emil Bakke, Associate Professor, Department of Design, Faculty of Architecture and design, Norwegian University of Science and Technology.

What happens to your information when the project ends?
The information is anonymized continuously in the project. When the project is completed/and the assignment is approved (June 2022), all associated data and information will be deleted.

Your rights
As long as you can be identified in the data material, you have the right to:
- Access to which personal information is registered about it, and receive a copy of the information.
- To have personal information about you changed.
- To have personal information about you deleted.
- To send a complaint to the Norwegian Data Protection Authority about the processing of your data.

Contact information
If you have questions about the study, contact me, project manager Mina Nordby or project supervisor Emil Bakke.

Department of Design, Faculty of Architecture and Design, Norwegian University of Science and Technology - Mina Nordby, project manager, and master's student
email: minano@stud.ntnu.no or phone: 902 53 180.

Department of Design, Faculty of Architecture and Design, Norwegian University of Science and Technology - Emil Bakke, supervisor, Associate Professor,
email: emil.bakke@ntnu.no or phone: 611 35 231.

Declaration of consent

I have received information about the study iPad in primary school: How to include parents to create acceptance and promote digital competence, and have had the opportunity to ask any desired questions. I understand that participation is voluntary and can withdraw consent at any time without giving reasons.

I have received and understood the information about the project, and have had the opportunity to ask questions. I agree to:

- ☐ Participate in an interview
  - ☐ That audio recording is made of the interview
- ☐ Participate in a survey

I agree that my information will be processed until the project is completed.

.....

(Signed by project participant, date)

Appendix 2: Interview guide

iPad as a digital learning tool in primary school

Introduction:
Thank you very much for taking the time to attend this interview to contribute to the insight work. You are asked to participate because you are employed at a primary school, and your knowledge and information are thus very useful for the project.

Questions:
Can you tell me briefly about your position at the school and your background as a teacher (school, position, how long you worked there, etc.)?

Is the iPad used as a learning tool in the school you work at?

When did the school you work at, start to use the iPad as a learning tool?

i. What learning platform does the school use (e.g. Showbie)?
ii. Which applications are being used?

Does each pupil have an iPad?

i. Can the pupils take the iPad home or is it only for use at school?

Is there any kind of restriction on the iPad? For example, is it not possible to go to the internet, or download other applications? Or time constraints?

Can you tell us about how pupils use the iPad for schoolwork in class and homework?

i. Is the iPad used as a learning tool in all subjects?
ii. How has the training process of the tool been for the children?

Can you tell us about how you as a teacher use the iPad in a school context?

i. How has the training process of the tool been?

Can you tell us about how parents use the iPad in school?

i. How has the training process of the tool been?

Are pupils allowed to decide when the iPad will be used in teaching and learning?

Are pen and paper still used in school?

i. In what contexts?

As an employee at the school, have you received training on the technical use of the equipment you have available at the school so that you can:

a. help pupils and parents with start-up and use?
b. help with any errors that may occur?
c. pedagogical use of digital tools so that they can be used in teaching?
    i. Who have you been trained by?
    ii. Was the training useful and important?

Do you have the impression that the parents have been positive or negative about using the iPad in school?

i. Have there been any strong reactions?
ii. Have there been major disagreements about the team?

Do you have the impression that the parents take part in the children's learning on the learning platform?

i. Do you think anyone finds it challenging to participate?

As a teacher, do you have a perception of a lack of digital competence among parents with children in primary school?

I want to include and motivate parents in the process where the children use the iPad as a learning board, by either creating a clear graphic presentation or a user journey, what do you think as a teacher could be motivating and perceived as inclusive for the parents?

i. Do you think it is useful?

End:

Thank you so much for taking the time to talk to me, it has been very important to me in the process ahead.

Further in the project, I need to reach out to a parent group in the form of a survey, is this something you can help with? If so, how is the process going?

Appendix 3: Consent form digital questionnaire

Questionnaire about parents' perception of their roles in children's digital learning.

Purpose
My name is Mina Nordby, and I am a master's student in Interaction Design at NTNU in Gjøvik. This semester I am writing a master's thesis as a conclusion to the study. The theme of the master's thesis is about the use of the iPad as a learning tool in primary school and this questionnaire is about parents' perception of their roles in children's digital learning. You are asked to participate because you are a parent of children in primary school.

Voluntary and anonymous participation
All the answers you give are anonymous and you can withdraw from the digital survey at any time by canceling.

Privacy
The information about you will be treated confidentially and in accordance with the privacy regulations. Only the project group (student and supervisor) will have access to your anonymous answers to the survey.

The data collection will be stored on the student's SharePoint page at NTNU (OneDrive) which is protected with two-factor authentication through Feide.

Who will have access
Department: Department of Design, Faculty of Architecture and Design, Norwegian University of Science and Technology.

Student: Mina Nordby, student, master in interaction design, Department of Design, Norwegian University of Science and Technology.

Supervisor: Emil Bakke, Associate Professor, Department of Design, Faculty of Architecture and Design, Norwegian University of Science and Technology.

Contact information

If you have questions about the study, contact me, the project manager, or project supervisor Emil Bakke.

Mina Nordby, project manager, and master's student e-mail: minano@stud.ntnu.no or telephone: 902 53 180.

Emil Bakke, supervisor, Associate Professor, email: emil.bakke@ntnu.no or telephone: 611 35 231.

When the project is completed/the assignment is approved (June 2022), all associated data and information will be deleted.

The survey has 15 questions divided into 3 parts and lasts about 10 minutes.

I have read the information above and agree to participate in the survey

O Yes O No

Appendix 4: Digital questionnaire

Questionnaire about parents' perception of their roles in children's digital learning.

I have read the information above and agree to participate in the survey

1. Yes
2. No

Part 1 General information

Gender

Man

Woman

Other

Age

(fill in)

Which class does your child/children go to?

(Multiple choice both on grade and amount of children)

1st grade

2nd grade

3rd grade

4th grade

What is your current academic level?

Elementary school

High School

Vocational education

University education

Other...

Do you use any of the following technologies in your daily routine? If so, also indicate how often you use it.

Every hour (1) Every day (2) At least once a week (3) At least once a month (4) Never (5)

1. PC
2. Smartphone
3. iPad or tablet
4. Smartwatch
5. Smart house device

Do you have internet and wireless access at home? If so, state which ones.

Tele line

Cable

Satellite

Mobile network

No

Other...

Part 2 Parents perception of digital tools for their children

Parents' perception of children's learning

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

1. I think it is important for my child's future to use digital learning tools such as the iPad.
2. I think my child can easily learn new digital tools like the iPad.
3. I think it's good for my child to know the iPad as a learning tool.
4. I encourage my child to learn new things via iPad.
5. I perceive my child to be more motivated to learn via iPad as a learning tool.
6. I think my child prefers digital learning on an iPad over learning without digital tools.

Parents' understanding of digital learning

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

1. I can use digital devices such as desktops and tablets to gather information or complete tasks.
2. I can use online resources to search for information.
3. I have the digital skills needed to help and support my child with schoolwork on digital tools like the iPad.
4. I have the impression that the parents in the parent group have different levels of digital competence (low to high).
5. I believe that digital tools are a more practical and effective alternative to traditional textbooks and other printed materials such as dictionaries.
6. I can communicate via digital devices such as computers or smartphones for discussions or information sharing.

Parents' perception of e-learning

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

1. I'm interested in what my child does with digital learning on the iPad.
2. I know how to use the iPad for digital learning.
3. I support and get involved when my child uses the iPad as a digital learning tool at home.
4. I think it is safe for my child to use the iPad as a learning tool both at home and at school.
5. I am skeptical of digital learning and the use of digital learning tools at school.

Part 3 Parents role in the usage of digital tools

As a parent, I facilitate her digital learning environment by

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

1. Acquire hardware such as a computer and tablet
2. Have printing available.
3. Assist with a sensible choice of online sources.
4. Strategic time limit on iPad.
5. Strategic placement of iPad (not allowed in the bedroom etc)

As a parent, I'm concerned that my child's use of the iPad and digital learning aids will lead to:

1. Poorer handwriting
2. Dependence on technology
3. Poorer sleep
4. Poorer vision
5. Exposed to inappropriate content
6. Access to inaccurate information
7. Easier to plagiarize greater likelihood of cheating
8. Greater differences between children due to a possible lack of a digital learning environment at home

Parents' motivation for digital learning

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

I am motivated to take part in children's learning on the digital learning platforms

Parents' participation in the digital learning platforms

Never (1) Every month (2) Every week (3) Every day (4) Every hour (5)

1. How often do you check if updates/information have been posted on the digital learning platform that applies to your child?
2. How often do you read the information on the digital learning platform that applies to your child?
3. How often are you active on the digital learning platform that applies to your child?

Parents' use of digital learning platform

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

I use the digital learning platform as actively as I want to.

Parents' introduction to the iPad as a learning tool

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

1. I have received a course/training in the use of the iPad as a learning board when it was introduced to my child.
2. I know who I can contact if I have any questions regarding the iPad as a learning board in school.
3. I feel included in the use of the iPad as a digital learning tool in school for my child.

Ending note:

Thank you so much for participating in the survey! This has been a great help for the study! If you have an extra comment, feel free to leave it here.

Appendix 5: Example of iPad contract

Ordensregler for bruk av iPad

Generelt om bruk:

- Det er lærer som definerer når og hvordan iPaden skal brukes.
- iPaden er skolen eiendom, og skal behandles etter de regler for bruk som skolen definerer.
- iPaden skal alltid være inne i beskyttelsesdekslet, både på skolen og hjemme.
- iPaden skal ikke lånes ut til andre.
- iPaden skal alltid være tilstrekkelig oppladet ved skoledagens start.
- Det er ikke lov å laste opp egne apper på iPaden.
- Det er ikke lov å spise eller drikke på samme pult/bord som iPaden ligger på.
- Det er aldri lov å ta bilder/video av medelever/ansatte uten tillatelse fra lærer, og den/de det skal tas bilde av.
- Når iPaden ikke er i bruk i undervisningen, skal den ligge i sekken, også i tilsynstiden og leksehjelp.
- Det er ikke tillatt å spille spill i skoletiden/leksehjelp/tilsyn.

Bruksområder

- iPaden skal kun brukes til skolearbeid i skoletiden.
- iPaden kan ikke brukes i friminutt.
- iPaden skal alltid ligge i sekken til og fra skolen.

Internett

- Det er ikke tillatt å gå på internett uten lærers samtykke.
- Det er kun tillatt å gå på nettsteder som har med skolearbeidet å gjøre.

Konsekvenser ved brudd på reglene

- Dersom eleven ikke kan forholde seg til reglene, vil iPad bli inndratt.
- Det vil ikke bli gitt advarsler ved evt. brudd på disse reglene.
- iPaden vil umiddelbart bli inndratt for videre bruk, og må hentes av foresatte.
- Den enkeltes iPad kan bli blokkert for nettilgang.
- Installerte apper kan bli slettet uten varsel.
- Eleven kan miste muligheten til å ta med iPaden hjem for kortere eller lengre perioder.

----------Svarslipp ----------klippes av----------leveres skolen----------

Elevens underskrift: _____ Trinn:_____

Foresattes underskrift: _____ iPad kode: _____

Mina Nordby

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